LITTELL'S LIVING AGE.

No. 1345.—March 12, 1870.

CONTENTS.

1.	Geological Theory in Britain,	*Edinburgh Review*,	643
2.	Madame Elisabeth,	*Spectator*,	657
3.	Poems on Natural History,	*Spectator*,	661
4.	Jane Austen,	*Fortnightly Review*,	663
5.	Earl's Dene. Part IV.	*Blackwood's Magazine*,	667
6.	Home Life of Sir David Brewster,	*Pall Mall Gazette*,	681
7.	A Bishop of the Twelfth Century,	*Fraser's Magazine*,	685
8.	Measuring Star-Heat,	*Spectator*,	698
9.	Vanished and Vanishing Industries,	*Leisure Hour*,	700
10.	Dust and Disease,	*Pall Mall Gazette*.	701

POETRY.

The Old Geologist,	642	Absence,	642
Fairy Faces,	642		

SHORT ARTICLES.

Sleep and Habit,	656	Songs of a Wayfarer,	680
Artificial Light,	660	Warming Railway Carriages,	684
The New Night Timepiece,	662	The Best Family in England,	697
"Come to the Woods" and Other Poems,	680	Terrestrial Magnetism,	699
		Forms for Telegraphic Messages.	704

Our New Subscribers, and others, are impatient to get more frequent supplies of some of our serial stories. It may be well, therefore, to explain that most of these stories are received from England in *monthly* instalments, which are given to our readers without delay.

PUBLISHED EVERY SATURDAY BY

LITTELL & GAY, BOSTON.

TERMS OF SUBSCRIPTION.

For Eight Dollars, *remitted directly to the Publishers*, the Living Age will be punctually forwarded for a year, *free of postage*. But we do not prepay postage on less than a year, nor where we have to pay commission for forwarding the money.

Price of the First Series, in Cloth,	36	volumes,	90	dollars.
" " Second "	"	20	"	50	"
" " Third "	"	32	"	80	"
The Complete Work,		100	"	250	"

Any Volume Bound, 3 dollars; Unbound, 2 dollars. The sets, or volumes, will be sent at the expense of the publishers.

PREMIUMS FOR CLUBS.

For 5 new subscribers ($40.), a sixth copy; or a set of Horne's Introduction to the Bible, unabridged, in 4 large volumes, cloth, price $10; or any 5 of the back volumes of the Living Age, in numbers, price $10.

THE OLD GEOLOGIST.

Amid his fossils stretched he lay,
Himself almost a fossil,
Fast burning out the vital ray,—
Truth's sturdiest apostle.

Bones, teeth, and shells which he had found,
Queer spoils of happy labours,
And grinning saurians plastered round,—
These were his friends and neighbours.

Those ancient forms he loved to scan.
Whate'er had done their duty
In Nature's vast unfolding plan,
To him were things of beauty.

Awhile they lived, anon they died,
Each fitly in his station,
Where Life and Death worked side by side,
Twin daughters of Creation.

In rankest jungles freely roved
A thousand curious creatures;
He knew them well, and knowing loved
Their gaunt, ungainly features.

The trilobite and corals fair
Possessed the teeming ocean;
Huge winged monsters clove the air,
And all was sport and motion.

But one by one they shed their pride
And bowed to Death's dominion,
Whose shafts recked not of mammoth's hide,
Or pterodactyl's pinion.

He tracked the endless march of time
Along the steps of ages;
His searching reason found no prime,
But only older stages.

New shapes of elder shapes were born,—
No break in the succession,—
A waxing day without a morn,—
One whole and grand progression.

And is this all? is this the sum
Of man's supreme endeavour,
To know that, when the hour is come,
He too must pass — for ever,—

Like any other feeble prey
For whom, beyond debating,
With ready arrow poised alway,
Sure Death is calmly waiting?

Shall spotless Truth whom he has wooed
With all a martyr's passion,
Declare the fate, in mocking mood,
That slays him in such fashion?

His loyal flame ne'er growing dim
Shall he hereafter cherish,
Or must she veil her face for him,
And leave him now to perish?

The secret of this wondrous plan
By searching who can find it?
Yet something tells the inner man
There must be more behind it.

St. Paul's

FAIRY FACES.

Out of the mists of childhood,
Steeped in a golden glory,
Come dreamy forms and faces,
Snatches of song and story;
Whispers of sweet, still voices;
Rays of ethereal glimmer,
That gleam like sunny heavens,
Ne'er to grow colder or dimmer:
Now far in the distance, now shining near,
Lighting the snows of the shivering year.

Faces there are that tremble,
Bleared with a silent weeping;
Weird in a shadowy sorrow,
As if endless vigil keeping;
Faces of dazzling brightness,
With childlike radiance lighted;
Flashing with many a beauty
Nor time nor care had blighted;
But over them all there's a glamour thrown —
Bright with the dreamy distance alone.

A glow in the Christmas halo,
Shining with heavenly lustre,
These are the fairy faces
That round the hearthstone cluster;
These the deep, tender records,
Sacred in all their meetness,
That, wakening purest fancies,
Soften us with their sweetness;
As gathered where flickering fagots burn —
We welcome the holy season's return.

Argosy. William Duthie.

ABSENCE.

The April sunshine, soft and fair,
Touches the meadows cheerily;
Wild violets scent the warm still air;
But ever through the bright spring hours,
The sunshine and the opening flowers,
My spirit hungers to be fed,
And faints for love's dear daily bread,
Yearning, beloved, for thee!

The day wears on, the evening lone
Comes up across the misty lea;
I watch the stars as one by one
They glimmer out; my eyes are wet;
My heart is filled with vague regret,
Haunting it like a sad refrain;
I cannot still this restless pain,
Thinking, beloved, of thee!

The twilight deepens; brooding sleep
Shadows the green earth tenderly;
The house lies hushed in slumber deep;
The peace of heaven seems strangely near;
I kneel beneath the moonbeams clear,
And soft upon my troubled breast
Comes down a blessed sense of rest,
Praying, beloved, for thee!

Chambers' Journal.

From The Edinburgh Review.

GEOLOGICAL THEORY IN BRITAIN.*

THE presidential address for the current year, delivered by Professor Huxley to the Geological Society, demands a careful attention, not merely because of its ability and incisiveness, but especially on account of the importance of the issues involved. We propose to follow up some of the lines of inquiry therein suggested, and to test the present condition of geological theory in Britain by bringing to bear upon it the light derived from discoveries in other fields of investigation. Geology, indeed, the youngest born of the sciences, has suffered much, as well as gained much, from the special character of the labours of her followers. If during the last thirty years she has gained enormously by the strictness with which one section of her votaries have interpreted the past history of the earth by their own experience of its present condition, she has also lost greatly by isolation from other sciences. The light thrown on the ancient constitution of the earth by the present state of extra-terrestrial matter has been persistently ignored in this country, and geologists of the more popular school have practically assumed that our orb has ever been and will ever be very much as it is now. Are we to believe, with the poet Ovid, that although changes are continually going on, the whole order of nature remains constant? or is there evidence of a never-ending cycle of change? or, again, is there any proof of a definite progress somewhence, somewhither? These weighty questions are involved in the discussion of geological theory.

Professor Huxley tells us that he comes forward as the geological attorney-general for the time being, to plead against the charge made by the eminent physicist Sir William Thomson,† "that a great reform in geological speculation seems now to have become necessary." "It is quite certain that a great mistake has been made, that British popular geology at the present time is in direct opposition to the principles of natural philosophy." These grave charges are based on the assumption that the geologist demands unlimited time for the explanation of the phenomena manifested by the rocks, while, on the other hand, the tidal retardation of the earth, by which its revolution on its axis is checked by the attraction of the sun and moon, renders it impossible for life to have existed on the earth more than some such period of time as one hundred million years. According to the observed rate of retardation, the earth must then have been revolving so fast that no life could have existed on its surface. A second argument is found in a calculation of the age of the solar heat, in which, according to the present rate of emission, the sun could not have illuminated the earth for more than from one million to five hundred million years; and a third, on a secular cooling of the earth, from which the conclusion is drawn that from fifty to three hundred millions of years ago the earth was sufficiently heated to become molten at the surface. Such are the grounds on which Sir William Thomson founds his attack.

It is undoubtedly true that from the loose way in which some eminent writers speak of geological time, Sir William Thomson is justified in recording his protest. Mr. Darwin, for instance, demands no less than three hundred million years for the erosion of the Wealden area between the chalk ranges of the North and South Downs; while the late Professor Jukes thought that it is just as likely that Mr. Darwin's estimate, multiplied by ten, may be true. Professor Phillips, on the other hand, is contented with three hundred thousand years for the production of the same results, assuming that the rate of erosion is one inch per annum. Sir William Thomson is right, in our opinion, in attacking speculations such as these, and the idea of boundless time in the past, but he errs in assuming that there is any necessary connexion between his limit of years and any geological theory whatever.

Professor Huxley pleads for his clients at the bar of public opinion with remarkable

* 1. *Address of Professor T. H. Huxley, LL.D., F.R.S. President to the Geological Society of London.* Feb. 19, 1869.

2. *Experiences synthetiques relatives aux Meteorites.* Par M. A. DAUBREE. 8vo. Paris: 1868.

3. *Spectrum Analysis.* By H. E. ROSCOE, B. A., Ph. D., F.R.S., Professor of Chemistry in Owen's College, Manchester. 8vo. London: 1869.

† On Geological Time, Trans. Geol. Glasgow, vol. iii.

force and ability He first of all takes for granted that the earth has only been habitable during either 100,000,000 or 500,000,000 years, and then admits that the smaller estimate is quite sufficient to account for all geological phenomena by the operation of the present natural causes.

"I presume that 100,000 feet may be taken as a full allowance for the total thickness of stratified rocks containing traces of life; 100,000, divided by 100,000,000 = 0·001. Consequently the deposit of 100,000 feet of stratified rock in 100,000,000 years means that the deposit has taken place at the rate of .001 of a foot, or say, 1-83 of an inch, per annum.

"Well, I do not know that anyone is prepared to maintain that, even making all needful allowances, the stratified rocks may not have been formed, on the average, at the rate of 1-83 of an inch per annum. I suppose that if such could be shown to be the limit of world-growth, we could put up with the allowance without feeling that our speculations had undergone any revolution. And perhaps after all, the qualifying phrase, 'some such period,' may not necessitate the assumption of more than 1-166, or 1-249, or 1-332 of an inch of deposit per year, which of course would give us still more ease and comfort.

"But it may be said that it is biology, and not geology, which asks for so much time — that the succession of life demands vast intervals; but this appears to me to be reasoning in a circle. Biology takes her time from geology. The only reason we have for believing in the slow rate of the change in living forms is the fact that they persist through a series of deposits which geology informs us have taken a long while to make. If the geological clock is wrong, all the naturalist will have to do is to modify his notions of the rapidity of change accordingly. And I venture to point out, that when we are told that the limitation of the period during which living beings have inhabited the planet to one, two, or three hundred million years requires a complete revolution in geological speculation, the *onus probandi* rests on the maker of the assertion, who brings forward not a shadow of evidence in its support."

This reasoning is clear and crushing so far as it goes, but it involves an assumption which cannot fairly be granted. Professor Huxley speaks as if the deposition of 1-83 or 1-332 of rock could be said to have been deposited year after year, without break and without intermission. If there be one thing proved more than another, it is that there is an interval of time between any two strata in juxtaposition. That rocks are deposited in different strata implies a break of continuity. The same fact is brought more vividly to notice by the presence of one rock on the upturned wave-worn edges of another, such as may be seen in many Silurian localities, and especially in the Coal Measures and overlying strata in Somersetshire. These breaks have been proved by Professor Ramsay to represent an indefinite lapse of time, which in some cases must have been very considerable. The rocks, moreover, as we find them now are confessedly the mere rags and tatters of those that have been, and do not represent in any sense whatever a perfect and unbroken sequence. To what extent the present strata are representatives of the entire series we do not know, and until accurate knowledge on this point can be gained, it is idle to divide their total thickness by any hypothetical number of years. The breaks in the succession may or may not represent a lapse of time as great as that during which the existing strata were formed. Sir William Thomson's limit of years therefore cannot be tested by a mere sum in division. So far as the geological evidence goes we are in profound ignorance of the lapse of time represented by the stratified rocks; they are as likely to have been deposited in one million as in five hundred millions of years. Sir William Thomson has not proved that his allowance of time is too small for the geologists, nor has Professor Huxley proved it to be sufficient for them in his argument which we have quoted.

Professor Huxley, however, carries the war successfully into his opponent's camp, by showing that the eminent mathematicians and physicists are by no means agreed as to the cause of tidal retardation, or that the sun is a mere cooling body, like a hot brick, without the power of renovation, or that the cooling of the earth may not have been retarded by an atmosphere containing more aqueous vapour than our own. Until all these questions are finally settled, it seems to us that any speculation as to the age of the earth based on purely mathematical considerations must be worthless.

At present there are no data for their solution.

The principal ground of difference between Sir William Thomson and the geologists is the relation of geological time to our unit of years. If we use the term Silurian epoch, we merely refer to that indefinite interval between the Cambrian and the Devonian periods, during which, or a portion of which, the Silurian rocks were being deposited, not to an exact and well-defined period, like the reign of William the Conqueror. The geological "when" simply means before and after certain observed phenomena, while the historical involves also the idea of how long before and how long after. The use of years as a means of reckoning the past, therefore, is merely co-extensive with the range of history. Who, for example, would dream of fixing the date of the arrival of the stone or bronze folk in Europe? If, then, years cannot be made use of in the computation of events that happened in the period immediately outside history, how can they be used in estimating the lapse of time between even the latest geological epoch and the present day? Sir William Thomson, in his attempt to limit the duration of life on the earth to a maximum of five hundred millions years, errs precisely in the same way as Mr. James Croll,* in his calculation of the date of the glacial period. All such attempts to gauge the geological past by years can only end in vanity and vexation of spirit.

We will now pass to the examination of Professor Huxley's definition of the present state of geological theory. There are three great schools of geological thought, each of which is more or less antagonistic to the other two — Catastrophism, Uniformitarianism, and Evolutionism. The first of these accounts for all geological phenomena by "the operation of forces different in their nature or immeasurably different in power," from those that we see in action in the universe. The doctrine of violent upheavals of mountains, of the sudden depression of continents, of universal cataclysms, and the like, is catastrophic, in so much as it assumes that the forces by which they were brought about were more intense than, or different from, any of those which we now experience. The Hindoo, the Egyptian, and the Mosaic cosmogonies may be quoted as examples as well as that of the Stoics. During the sixteenth, seventeenth, and eighteenth centuries this method of accounting for geological phenomena was almost universal, and at the present time it is undoubtedly the most popular on the continent of Europe. Among the most eminent of its exponents in modern times may be reckoned Baron Humboldt, M. Elie de Beaumont, Professor Sedgwick, and Sir Roderick Murchison.

"The crust and outline of the earth" (writes the latter, in the last edition of his Siluria), "are full of evidences that many of the ruptures and overthrows of the strata, as well as great denudations, could not even in millions of years have been produced by agencies like these of our own times . . . We further maintain that no amount of time (of which no true geologist is ever parsimonious when recording the history of bygone accumulations of sediment, or of the different races of animals they contain) will enable us to account for the signs of many great breaks and convulsions which are visible in every mountain chain, and which the miner encounters in all underground workings."

This may be taken as a fair exposition of the catastrophic creed.

The second, or the uniformitarian, is the doctrine of Hutton and Lyell, by which all phenomena in the past history of the earth are ascribed to forces identical in nature with, and not more energetic than, those now active on the face of the earth. From this point of view the forces that are now bringing about changes so gradually that they almost escape observation, are adequate to produce the most stupendous geological results in unlimited time. Things have remained during the remote past very much as we have known them during the last two or three thousand years, and the equilibrium of nature has not been destroyed, although local changes have taken place. According to Hutton, there is no physical evidence "of a beginning — no prospect of an end." And in this he is followed by the great apostle of the Uniformitarian school, Sir Charles Lyell.

"As geologists, we learn that it is not only the present condition of the globe which has

* Phil. Mag. 1865-6.

been suited to the accommodation of myriads of living creatures, bnt that many former states also have been adapted to the organization and habits of prior races of beings; the disposition of the seas, continents, and islands, and the climates have varied; species likewise have been changed; and yet they have been so modelled on types analogous to those of existing plants and animals as to indicate throughout a perfect harmony of design and unity of purpose. To assume that the evidence of beginning or end of so vast a scheme lies within the reach of our philosophical inquiries, or even of our speculations, appears to be inconsistent with a just estimate of the relations which subsist between the finite powers of man and the attribute of an infinite and eternal Being." *

We fully endorse Professor Huxley's criticism on this passage: —

"Why for all time must the geologists be content to regard the oldest fossiliferous rocks as the ultima thule of his science, or what is there inconsistent with the relations between the finite and the infinite mind, in the assumption that we may discern somewhat of the beginning, or of the end, of this speck in space we call our earth? . . . This attempt to limit at a particular point the progress of inductive and deductive reasoning from the things which are to those which were — this faithlessness to its own logic, seems to me to have cost uniformitarianism the place, as the permanent form of geological speculation, which it might otherwise have held."

There can be no doubt that this doctrine has been mainly instrumental in raising geology to the rank which it now occupies among the sciences, and that the law of rigid induction which it inculcates has led to most important results; but it seems to us that the time during which we have been able to observe existing phenomena is too short for a sweeping generalization as to those which have happened in the immeasurable past. As catastrophism has erred in not exhausting the known causes, before flying to the unknown, so uniformitarianism has erred in another direction in ignoring all speculation of a state of things on this earth different from that which we experience at the present day. Both Sir Charles Lyell and Hutton have fixed their eyes so intently on the stratified rocks that they have omitted to notice any condition of things which existed before those rocks were formed: —

"The astronomer," writes the former, "may find good reasons for ascribing the earth's form to the original fluidity of the mass in times long antecedent to the first introduction of living beings into the planet; but the geologist must be content to regard the earliest monuments which it is his task to interpret as belonging to a period when the crust had already acquired great solidity and thickness, probably as great as it now possesses; and when volcanic rocks, not essentially differing from those now produced, were formed from time to time, the intensity of volcanic heat being neither greater nor less than it is now."*

In another passage, however, he seems to admit that the earth was at one time fluid, and thus he accounts for its present internal heat; but he merely devotes one short paragraph in the last edition of the Principles† to this most important subject. He seems moreover to trust to the renovating powers of nature for the restoration of the heat which is radiated from the earth, and he throws out the suggestion that it may be restored by electrical forces — a suggestion which is equivalent to saying that the earth's loss by radiation is made up by the access of heat from without, since by Mr. Grove's experiments it has been shown that light, heat, electricity, and motion are convertible terms. Sir Charles Lyell himself would, we are sure, be very unwilling to maintain this last proposition. If the original molten condition of the earth be admitted, as we believe it must be, the uniformitarian doctrine cannot be maintained in its entirety. If, on the other hand, we refuse to recognize any condition of things on this earth different from that in which we now live, we not only shut ourselves off from all considerations of the origin of our planet, but also from some of the more interesting and valuable deductions of modern physics. "Inasmuch," argues Sir William Thomson, "as energy is being continually lost from the earth by conduction through the upper strata, the whole quantity of plutonic energy must have been greater in past times than in the present."‡ The uniformitarian critic, in the "Quarterly Review,"§ gets over this difficulty by the device of comparing the earth to a man-of-war, and its store of potential energy to the magazine, and he proceeds to show that the gun loaded with the last charge of powder in the ship may possibly be as effective as that fired with the first. It is undoubtedly true, that the quantity of powder does not influence the fire of the guns, but we fail to see how that fact bears on the energy stored up in the earth. Were the actual terrestrial energy as completely isolated from the potential as the charge in the gun from the

* Principles of Geology, 10th edit. vol. ii. p. 613.

* Principles, vol. ii. p. 211.

† Vol. ii. p. 227.

‡ Of Geological Dynamics, p. 21. (Trans. Geol. Soc. Glasgow.)

§ No. 249, July 1868, p. 204.

powder in the magazine, the analogy might hold good. Since, however, we have no reason for believing that this is the case, we must look upon the argument as an ingenious attempt to kick a stumbling-block out of the uniformitarian path. We shall adduce geological evidence that the terrestrial energy was greater in the past than it is now, in discussing the third great geological school, although in the survey of the stratified rocks there be no direct proof of its diminution.

Catastrophism is, according to Professor Huxley, the doctrine of a past era in geological inquiry; uniformitarianism, that of the present; while to the third, or evolutionism, he assigns the high honour of being that of the future. The evolutionists of the present day are few in number but eminent in reputation. Dr. Tyndall, Mr. Herbert Spencer, Professor Huxley, and Sir William Thomson may be quoted as the most prominent leaders in England. The doctrine of the origin of species is indeed merely evolutionism applied to biology, and so far Mr. Charles Darwin may also be considered to belong to this school. Its founder was the great Emanuel Kant, whose work in physical science is only now beginning to be duly recognized:—

"Kant (writes Prof. Huxley) expounds a complete cosmogony, in the shape of a theory of the causes which have led to the development of the universe from diffused atoms of matter endowed with simple attractive and repulsive forces.

"'Give me matter,' says Kant, 'and I will build the world;' and he proceeds to deduce from the simple data from which he starts, a doctrine in all essential respects similar to the well-known 'Nebular Hypothesis' of Laplace. He accounts for the relation of the masses and the density of the planets to their distances from the sun, for the eccentricities of their orbits, for their rotations, for their satellites, for the general agreement in the direction of rotation among the celestial bodies, for Saturn's ring, and for the zodiacal light. He finds in each system of worlds indications that the attractive force of the central mass will eventually destroy its organization by concentrating upon itself the matter of the whole system; but, as the result of this concentration, he argues for the development of an amount of heat which will dissipate the mass once more into a molecular chaos such as that in which it began.

"Kant pictures to himself the universe as once an infinite expansion of formless and diffused matter. At one point of this he supposes a single centre of attraction set up, and by strict deductions from admitted dynamical principles shows how this must result in the development of a prodigious central body surrounded by systems of solar and planetary worlds in all stages of development. In vivid language he depicts the great world-maelstrom widening the margins of its prodigious eddy in the slow progress of millions of ages, gradually reclaiming more and more of the molecular waste, and converting chaos into cosmos. But what is gained at the margin is lost in the centre; the attractions of the central systems bring their constituents together, which then by the heat evolved are converted once more into molecular chaos. Thus the worlds that are, lie between the ruins of the worlds that have been and the chaotic materials of the worlds that shall be; and in spite of all waste and destruction Cosmos is extending his borders at the expense of Chaos."

Kant then proceeds to apply his views to the earth by an appeal to the "gradual changes now taking place," by earthquakes, by marine and fresh-water action, by the winds and frosts, and finally by the operations of man. In common with Lyell and Hutton, he argued from the present order of things to the past, using, so far as the knowledge of his day would allow, the uniformitarian doctrine: —

"With as much truth as Hutton, Kant could say, 'I take things just as I find them at present, and from these I reason with regard to that which must have been.' Like Hutton, he is never tired of pointing out that 'in nature there is wisdom, system, and constancy.' And as in these great principles, so in believing that the cosmos has a reproductive operation 'by which a ruined constitution may be repaired' he forestalls Hutton; while, on the other hand, Kant is true to science. He knows no bounds to geological speculation but those of the intellect. He reasons back to a beginning of the present state of things; he admits the possibility of an end."

Professor Huxley is perfectly justified in his high estimate of Kant as the founder of the system of evolution, although the advance of modern science renders some of the views of the latter untenable.

These three schools of geological speculation are not necessarily antagonistic: —

"Catastrophism has insisted upon the existence of a practically unlimited bank of force, on which the theorist might draw; and it has cherished the idea of the development of the earth from a state in which its form, and the forces which it exerted, were very different from those we now know. That such difference of form and power once existed is a necessary part of the doctrine of evolution.

"Uniformitarianism, on the other hand, has with equal justice insisted upon a practically unlimited bank of time, ready to discount any quantity of hypothetical paper. It has kept before our eyes the power of the infinitely little, time being granted, and has compelled us to

exhaust known causes before flying to the unknown.

"To my mind there appears to be no sort of necessary theoretical antagonism between Catastrophism and Uniformitarianism. On the contrary, it is very conceivable that catastrophes may be part and parcel of uniformity. Let me illustrate my case by analogy. The working of a clock is a model of uniform action; good time-keeping means uniformity of action. But the striking of the clock is essentially a catastrophe; the hammer might be made to blow up a barrel of gunpowder, or turn on a deluge of water; and, by proper management, the clock, instead of marking the hours, might strike at all sorts of irregular intervals, never twice alike in the intervals, force, or number of its blows. Nevertheless all these irregular and apparently lawless catastrophes would be the result of an absolutely uniformitarian action; and we might have two schools of clock-theorists, one studying the hammer and the other the pendulum.

"Still less is there any necessary antagonism between either of these doctrines and that of Evolution, which embraces all that is sound in both Catastrophism and Uniformitarianism, while it rejects the arbitrary assumptions of the one and the as arbitrary limitations of the other. Nor is the value of the doctrine of evolution to the philosophic thinker diminished by the fact that it applies the same method to the living and not-living world, and embraces in one stupendous analogy the growth of solar system from molecular chaos, the shaping of the earth from the nebulous cubhood of its youth, through innumerable changes and immeasurable ages, to its present form, and the development of a living being from the shapeless mass of protoplasm we term a germ."

The doctrine of Evolution thus eloquently advocated by Professor Huxley is remarkable for its simple explanation of the complex phenomena of the outer world. We shall proceed to test its value by an appeal to well-ascertained geological, physical, and astronomical facts, throwing aside all cosmogonies as mere matters of speculation which may or may not be true.

What do we actually know of the condition of the interior of the earth at the present day? After passing down through "the veil of the stratified rocks" more than ten miles in thickness, we suddenly arrive at the crystalline granites and granitoid series, that bear unequivocal traces of having been once in a molten state. These are found all over the earth at the base of the sedimentary series, and present everywhere, as the great Humboldt observes, the same essential mineralogical forms, and therefore the conditions under which they originated must have been the same universally. They are proved not only by the cavities filled with vitrified matter, found in their component crystals by Mr. Sorby, to have been formerly heated to a high degree, but also by the metamorphism of the strata immediately overlying them, such as the change of shale into mica schist, and of limestone into marble. The increase of temperature universally observed in the descent of mines, as well as the phenomena manifested by volcanos and hot-springs (that of Bath is 118 degrees), testify to a continual flow of caloric from the centre towards the circumference of the earth, and prove that at some point deep down the heat is sufficiently intense to fuse all known substances. According to Sir Charles Lyell, the increase of one degree for every sixty-five feet of descent would be sufficient to boil water at a depth of two, and melt iron at a depth of thirty-four, miles. If then we follow Professors Phillips and Bischoff in ignoring the effect of pressure on the fusing points of the different elements, a greater thickness than thirty or forty miles cannot be assigned to the solid crust of the earth, which must rest everywhere on matter kept fluid by intense heat. But we have no right to do this, since it has been proved by actual experiment that some substances, such as water and sulphur, can absorb an enormous quantity of heat under pressure without passing into the liquid or gaseous condition. Now the gravitating force exerted by thirty or forty miles of solid rock must be enormous, and the deeper we go the greater it will be; and therefore unless it can be proved that the increase of the expansive power of the heat preponderates over the compressing power of gravitation, the existence of a molten zone everywhere supporting a solid crust cannot be inferred. If the pressure preponderate as Mr. Scrope believes. the earth may be solid to its very core. By this line of inquiry therefore we can only safely infer that the interior of the earth is heated to an inconceivable degree, and as we do not know the relation of heat to pressure we cannot tell whether or no the surface of the earth be supported by a chaos of molten rock. If at any point the heated matter be kept solid by pressure it will start into fluidity if the pressure be lessened. Hence Mr. Scrope argues rightly that the outpouring of lava from volcanos has no necessary bearing on the thickness of the earth's crust.

Nor can we obtain any light on this point from the consideration of the phenomena of precession and nutation from which Mr. Hopkins ingeniously argued some thirty years ago, that the solid crust of the earth must be at least from 800 to 1,000 miles

thick. Sir William Thomson has lately inferred from the same premises that "no continuous liquid vesicle at all approaching to the dimensions of a spheroid 6,000 miles in diameter can possibly exist in the earth's interior without rendering the phenomena of precession and nutation sensibly different from what they are;" and that the earth, as a whole, must be far more rigid than glass and probably even more rigid than steel, "while the interior must be on the whole more rigid, probably many times more rigid, than the upper crust." These conclusions, drawn by two men of such eminence, clash with two well-ascertained geological facts. If the earth be a solid mass, pockets and isolated seas of lava may remain here and there at different depths, to be the foci of the volcanic and seismic energy, and thermal springs may be the result of the percolation of water down to the igneous reservoirs. This ingenious application of the theory of precession and nutation to the analysis of the thickness of the earth's crust might indeed be considered decisive had not M. Delaunay lately demonstrated before the French Academy by actual experiment that it had no bearing whatever on the problem. Both Mr. Hopkins and Sir William Thomson assumed in their calculation that the molten rock would be absolutely fluid and altogether devoid of viscidity. The eminent French mathematician proved that this latter property, inherent in all matter, would be sufficient to cause the earth, whether fluid or not in the interior, to behave precisely as if it were one homogeneous solid body. By imparting a slow revolving motion to a glass globe filled with water, he showed that both water and glass revolved precisely as if the whole had been frozen into one solid mass. The light therefore thrown by these researches on the condition of the interior of the earth is but darkness. The mathematicians of the present day for the most part accept the views of Mr. Hopkins and Sir William Thomson, while the geologists either maintain the existence of a fluid zone underneath the earth's crust, or pass by the problem altogether.

But if mathematics fail to tell us anything about the constitution of the interior of the earth, we do not appeal in vain to chemistry. We are indebted to M. Durocher* for a satisfactory classification not only of the crystalline rocks that underlie the sedimentary deposits, but also for absolute proof that the earth was an incandescent molten sphere before atmospheric and aqueous agencies had clothed it with the strata so familiar to our eyes. His researches, strange to say, are almost unknown in England, and have been noticed in but one of the many geological manuals that have been published during the last few years. They have, however, been endorsed by the high authority of Professor Haughton,* and have been approved by the most eminent mineralogist in Britain in his presidential address to the Geological Society.† M. Durocher divides all crystalline rocks into distinct classes, the one containing a mean proportionof 71·0 of silica, which he therefore terms siliceous, the other containing but 51·5, and being characterized by large percentages of lime, magnesia, manganese, and iron. To the first of these belong the granites, porphyries, and trachytes that underlie the stratified rocks, and occur also in all the older volcanic outbursts. They gradually become rarer and rarer from the palæozoic age to the present day. It is undoubtedly true that they are represented by the modern silicated trachytes and obsidians of the volcanos of the Andes and of Iceland; but these are poorer in silica and richer in earthy bases than the most ancient silicated outbursts, and are, moreover, now extremely rare. This group of rocks has a mean specific gravity of 2·4. To the second, which, from the predominance of earthy bases, he terms basic, belong all the trap and greenstone rocks, basalts, dolerites, and augitic lavas, that are rarely met with among the older products of subterranean energy, but which become more and more abundant through the palæozoic and mesozoic epochs, until at the present day they are the staple produce of volcanos. They possess a mean specific gravity of 2·72, being heavier than the siliceous group, in a ratio greater than that of water to oil. They have never been found in a position underneath the oldest sedimentary strata. Thus it is recognized that the silicated group of rocks which is the lighter is the older of the two, while the heavier is that which appeared later in time and gradually became prominent, manifesting itself in greater and greater force down to the present day. From these premises it follows that heavier basic rocks lie underneath the lighter granitic, whether fluid or not we cannot tell, and that the latter, from their rare occurrence in the products of existing volcanos, have for the most part cooled sufficiently to be solidified. It also follows from this arrange-

* Essai de Petrologie comparee. Annales des Mines, 5 serie, tom. xi. (1857).

* Manual of Geology, 1866, 8vo. 2nd ed. Lecture 1.
† Quart. Geol. Journ. 1867.

ment, according to specific gravities, that at one remote epoch of the earth's history there were two continuous zones of molten matter, as clearly defined from each other as water from oil, and that the lighter was the first to form a thin pellicle on the surface of the incandescent globe. It is worthy also of note that nearly the whole of the earliest, or palæozoic strata, is formed of the detritus of the granitic layer, and is remarkable for its poverty in limestones, while the comparatively large development of the latter during the carboniferous, mesozoic, and cainozoic periods may be ascribed to the large percentages of lime furnished by the basic layer, which was then making itself felt more and more at the surface. The granitic rocks, moreover, must be very thin as compared with the earth's radius, for if at the present day they were sunk sufficiently deep to be heated up to their fusing points in the earth they would more often be found among volcanic ejecta. There are no means of estimating the thickness of the basic layer. These deductions from M. Durocher's admirable essay may be assumed to be true in proportion as they explain the complicated phenomena presented by the igneous rocks. It is not too much to say that his theory reduces the chaos which is to be found in all geological manuals, except that of Professor Haughton, to an admirable Cosmos.

But our knowledge of the interior of the earth does not stop here. There is reason for the belief that under the heavy basic matter there are those elemental substances which are either sparingly or never found in a state of combination in either of the two layers of igneous rock, such as arsenic, antimony, selenium, gold, copper, and the heavy metals, which occur in a great many of our mines uncombined with a particle of oxygen. "The metallic ores," writes Professor Haughton, "whatever be the condition in which they are found in our mines, originally came from below sublimed from the interior of the earth as sulphur salts." The fact that mineral veins occur both in siliceous and basic rocks, in such a manner as to show that they are of later origin than either, points also in the same direction. The process may still be studied at the crater of any active volcano. The high specific gravity also of the earth tends strongly to corroborate this inference, for it is more than twice as great as either of the two kinds of igneous rocks; and when we take into consideration the comparatively low specific gravities of the latter, of water, and of the sedimentary rocks which are included in the estimate of 5·5 of the whole mass, it follows of necessity that the subjacent matter must be specifically heavier than 5·5. How much heavier we do not know, because of our ignorance of the thickness of the siliceous and basic layers; but it may fairly be assumed to be at least as heavy as the heavy bases and metals that range from 6·0 and upwards. Sir William Thomson throws out a speculation that it consists of a mass of magnetic iron, like that of some of the meteorites.

This evidence which we have adduced as to the ancient physical condition of the earth, is wholly inconsistent with the uniformitarian doctrine, because it points back to a time when the condition of the earth differed from that which it now presents. The arrangement according to density implies not only the igneous origin of the earth, but that in the time of its being in a molten state down to the present day it has been gradually cooling. The ignoring of this change of state constitutes, as Professor Huxley writes, the logical weakness of the uniformitarian doctrine. And just in proportion as the evidence is incompatible with the latter doctrine does it agree with Evolutionism, of which the chief corner-stone is the recognition of a change of state. The evidence points to change in a definite direction, it traces back the history of this earth to a time before the present order of things had been instituted, to a time before the molten sphere was cooled sufficiently to admit of the detrital action of water or of its accumulation in rivers, lakes, and seas.

Can we trace the earth's history further back than this? Are we justified in looking on our orb as a thing *sui generis*, united by no links with its fellow wanderers in space? If so, then we can never hope to gain any other idea of its early condition than that which has been sketched out. Fortunately the united labours of the chemist and the astronomer show that it is united with the planets and meteorites by a bond of the closest possible kind. Its present outward conditions now have been proved by Professor Phillips and others to be repeated in a most remarkable way in the planet Mars. The Martial surface is diversified by sea and land, and even is subject to the same climatal changes as our own. As the winter comes on the snows gradually creep over the ruddy surface towards the equator, until they cover an area round the poles extending as far as the forty-fifth degree of latitude with a shining mantle of white. When the spring comes round they retreat again, until at midsummer they form an arctic barrier extending ten degrees round the poles. Mars therefore has a polar and

a temperate region, and probably also an equatorial, just like that which we enjoy. It presents precisely the same phenomena to our eyes that would be seen were an observer on its surface to direct his telescope at our earth. We are therefore justified in concluding that in all essential features Mars is a mere repetition of the earth. So far as heat and cold, summer and winter, land and water, and atmospheric conditions generally, are concerned, there is every reason for believing that it is as fitted for the maintenance of life as our own planet. Unfortunately the rest of the planets are so concealed by thick cloud-envelopes that their true surfaces cannot be determined, but they have been proved by the researches of Father Secchi and M. Jannsen to possess atmospheres containing aqueous vapour. It is, then, by no mere guess-work that the earth is brought into correlation with other planets, but by the testimony of our own eyes. The singular identity of outward condition in the only planet in which the external surface can be properly examined, implies an affinity not only with it, but with the others. To suppose that the resemblance is a mere accident is to ignore the reign of law.

The meteoric evidence also is of the highest value in the correlation of the earth with extra-terrestrial matter. The astronomical discoveries of modern days have increased the number of planets from seven to eighty-eight.

"The smallest of these" (Mr. Grove writes*) "is only twenty or thirty miles in diameter, indeed, cannot be accurately measured, and if we were to apply the same scrutiny to other parts of the heavens as has been applied to the zone between Mars and Jupiter, it is no far-fetched speculation to suppose that, in addition to asteroids and meteorites, many other bodies exist until the space occupied by our solar system becomes filled up with planetary bodies varying in size from that of Jupiter (1,240 times larger in volume than the earth) to that of a cannon-ball, or even a pistol-bullet."

And as from time to time some of these smaller bodies become drawn within the influence of the earth's attraction, and fall to the ground as meteorites, we have the means of judging by chemical analysis of the constitution of what may be called planetary matter. It has long been known that they have never yielded any new elemental substance, and that they revolve round the sun in a cold state, the thin glaze on their surfaces being derived from the enormous friction which they undergo when they penetrate the earth's atmosphere. We are indebted to M. Daubrée for the admirable manner in which they have been classified, and in which their evidence has been brought to bear on our earth's structure. They consist of nickeliferous iron, combined with various proportions of stony matter; sometimes the iron is perfectly pure, and capable of being turned to the ordinary purposes of manufacture, at others it is represented by an extremely small percentage in combination with sulphur or oxygen. The number of meteoric elements, established by the results of more than one hundred analyses, amounts altogether to twenty-seven, or to considerably more than one-third of those discovered in the earth, and these are for the most part abundant. Oxygen, hydrogen, nitrogen and chlorine, iron, magnesium, lithium, silicium, manganese, aluminum, potassium, sodium, calcium, sulphur, and carbon, nickel, zinc, copper, arsenic, phosphorus, antimony, lead, and tin, are common terrestrial substances. Of the remaining four, cobalt, chromium, titanium, and selenium, the latter is the only one rarely met with on our earth, and it has been furnished only by the meteorite that fell at Bitbourg. If an equal weight of the earth's crust taken at haphazard were analyzed, it would hardly furnish a longer list of elements than this.

But the meteorites have a yet stronger bond of union with the earth than that of a mere elemental identity. They present precisely similar combinations of the elements to the number of over forty. The beautiful iridescent Labrador spar, for instance, is comparatively abundant. Serpentine also exists similar to that of Cornwall, and gypsum, while, if we believe in the doctrine of final causation, we may add sal-ammoniac for those that faint, and Epsom salts for those that require them. M. Daubrée has even succeeded in manufacturing meteoric matter from melted rock of the basic layer. His experiments show that they were consolidated in an atmosphere containing very little oxygen, since the oxydes are but rarely met with; and thus he accounts for the large percentage of metallic iron, which in our earth is represented by the almost universally distributed oxyde. This poverty of oxygen exists also in the heavy or basic layer of crystalline rocks.

The specific gravities also of meteorites illustrate forcibly those presented by the earth, for those which contain a large percentage of alumina have a density of 3·0, which corresponds very nearly with one of

* Correlation and Continuity, 1867.

the heavier basic rocks (lherzolite), while those which contain large percentages of the unoxydized metals range from 6·5 to 8. Thus the latter present a density nearly identical with that which from our previous argument has been assigned to the unoxydized terrestrial nucleus. Indeed, it is only reasonable to infer that the heavy meteorites are fair samples of the earth's nucleus since the lighter ones represent exactly some varieties of the basic layer above. In a word, some meteorites repeat so remarkably the structure of some terrestrial rocks, that no hard and fast line can be drawn between them. Moreover, there is a greater elemental difference to be observed between some meteorites and others, than between their whole mass and the earth. And therefore we may fairly conclude that both were formed out of the same elementary matter, which in the former has become perfectly cold, while in the lattter it is gradually cooling. This view of M. Daubrée's has been accepted in this country by no less authorities than Professor Warrington Smythe and Mr. Grove.

We will now pass on to the investigation of extra-terrestrial matter in a state of combustion, by the aid of spectrum analysis, by which "two German philosophers quietly working in their laboratories at Heidelberg" have obtained results almost challenging belief from their novelty and wonder. The light of sun, stars, nebulæ, and comets is made to unfold the constitution of the bodies whence it emanates. "It does indeed appear marvellous," says Professor Roscoe, "that we are now able to state with certainty, as the logical sequence of exact observations, that bodies common enough on this earth are present in the atmosphere of the sun at a distance of ninety-one millions of miles, and still more extraordinary, that in the stars the existence of such metals as iron and sodium should be ascertained beyond a doubt." Truth in this case, as in many others, is stranger than the wildest fiction. For a clear and attractive account of spectrum analysis we would refer to Professor Roscoe's work, above quoted, which consists of six lectures delivered in 1868 before the Society of Apothecaries, together with appendices that almost exhaust the subject. The history of the discovery of this remarkable means of acquiring knowledge of matter dates as far back as the year 1675, when Sir Isaac Newton succeeded in decomposing light into the six colours of the spectrum by passing it through a round hole in a shutter and a triangular prism of glass. In the beginning of this century, Dr. Wollaston modified the experiment by making the light pass through a fine slit instead of a round hole, and was consequently enabled to detect the fine black lines in the solar spectrum, which have led to such wonderful discoveries during the last ten years. The careful examination of these lines was the work of a German optician, Fraunhofer, by whom no less than five hundred and seventy-six were mapped in 1814. Their presence in every kind of sunlight, whether reflected as in the moon and planets or not, and their fixity of position in the spectrum, was ascertained by that acute philosopher.

"Another important observation was made by Fraunhofer, namely, that the light from the fixed stars, which are self-luminous, also contains dark lines, but different lines from those which characterize the sun light, the light of the planets, and that of the moon; and hence, in 1814, Fraunhofer came to this remarkable conclusion; that whatever produced these dark lines — and he had no idea of the cause — was something which was acting beyond and outside our atmosphere, and not anything produced by the sunlight passing through the air. This conclusion of Fraunhofer has been borne out by subsequent investigation, and the observations upon which it was based may truly be said to have laid the foundation-stone of solar and stellar chemistry." (*Roscoe's Spectrum.*)

While these discoveries were being made in the spectra of the sun and the stars, there was a corresponding advance in the knowledge of those of different terrestrial substances. Thomas Melville in 1752 first observed the yellow flame of sodium, while Sir John Herschel, after investigating the spectra of many coloured flames, wrote in 1827, "that the colours thus contributed by different objects to flame afford in many cases a ready and neat way of detecting extremely minute quantities of them." Fox Talbot, a name eminent in the annals of photography, describes the spectrum of the red fire of the theatres as being possessed of "many light lines or maxima of light." He then goes on to say that there are marked differences between the red, orange, yellow, and green fire, and throws out the probability "that a glance at the prismatic spectrum of a flame might show it to contain certain substances which would otherwise require a laborious chemical analysis to detect." He followed up the inquiry, and in 1836, after pointing out the differences between the spectra of lithium and strontium, he wrote, "that optical analysis can distinguish the minutest portion of these two substances from each other with

as much certainty, if not more, than any known method." Faraday's discovery that the electric spark "consists solely of the material particles of the poles and the medium through which it passes," was used by Sir Charles Wheatstone in 1834 for producing the spectra of incandescent metals; he was the first to attempt to represent them in a map. In 1845 Professor William Allen Miller experimented on the spectra of coloured flames produced by the metals of the alkaline earths, and represented his results by diagrams which approximated closely to the great discovery which Professors Bunsen and Kirschhoff arrived at in 1861; he would have anticipated the latter had he not used a luminous flame. Twelve years after this, Professor Swan pointed out the characteristic of the soda flame, and discovered the great sensitiveness of the sodium reaction, which had led previous observers astray, because they could not believe in the almost universal distribution of that element.

'There is not a speck of dust,' writes Professor Roscoe, "or a mote in the sunbeam, which does not contain chloride of sodium. Sodium is a prevailing element in the atmosphere; we are constantly breathing in portions of this elementary substance together with the air which we inhale. Two thirds of the earth's surface is covered with salt water, and the fine spray which is continually being carried up into the air evaporates, leaving the minute specks of salt which we see dancing in the sunbeam. If I clap my hands, or if I shake my coat, or if I knock this dusty book, I think you will observe that this flame becomes yellow. This is not because it is the hand or coat of a chemist, but simply because the dust which everybody carries about with him is mixed with sodium compounds. If I place in this colourless flame the piece of platinum wire, which has been lying on the table for a few minutes since I heated it red hot, you see there is sodium in it; there, we have for one moment the glimpse of a yellow flame. If I heat the wire in the flame the sodium salts will all volatilize, and the yellow flame will quite disappear; but if I now draw this wire once through my fingers, you observe the sodium flame will on heating again appear. If I heat it again and draw it through my mouth, it will be evident that the saliva contains a very considerable quantity of sodium salts. If I leave the wire exposed here, tied round this rod, so that the end does not touch anything, for ten minutes or a quarter-of-an-hour, I shall obtain the sodium reaction again, even if the wire be now perfectly free. This is because sodium salts pervade the atmosphere, and some particles of sodium dust flying about in the air of the room settle on the wire and show their presence in the flame."

Thus it was that the value of the bright lines in the different spectra in chemical analysis gradually became realized, until in 1860 Professor Bunsen employed them in his memorable discovery of two new elements — cæsium and rubidium.

"Shortly after he made his first experiments on the subject of spectrum analysis, Bunsen happened to be examining the alkalies left from the evaporation of a large quantity of mineral water from Dürkheim in the Palatinate. Having separated out all other bodies he took some of these alkalies, and found, by examining by the spectroscope the flame which this particular salt or mixture of salts gave off, that some bright lines were visible which he had never observed before, and which he knew were not produced either by potash or soda. So much reliance did he place in this new method of spectrum analysis that he at once set to work to evaporate so large a quantity as forty-four tons of this water in which these new metals, which he termed cæsium and rubidium, were contained in extremely minute quantities.

"In short, he succeeded in detecting and separating the two new alkaline substances from all other bodies, and the complete examination of the properties of their compounds which he made with the very small quantity at his disposal remains a permanent monument of the skill of this great chemist. Both these metals occur in the water of the Dürkheim springs. I have here the numbers giving Bunsen's analysis, in thousand parts, of the mineral water of Dürkheim and Baden-Baden.

"The quantity of the new substance contained in the water from the Dürkheim springs is excessively small, amounting in one ton to about 3 grains of the chloride of cæsium and about 4 grains of the chloride of rubidium; whilst in the Baden-Baden spring we have only traces of the cæsium chloride, and a still smaller quantity than in the other spring of the rubidium chloride. From the forty-four tons of water which he evaporated down Bunsen obtained only about 200 grains of the mixed metals."

The delicacy of this kind of test was firmly established by this wonderful result. Two years previously its importance as a means of recognizing extra-terrestrial matter was shown by the great physicist, Kirschhoff. "So long ago as 1814 Fraunhofer discovered that the dark lines in the sunlight were coincident with the bright sodium lines. The fact of the coincidence of these lines is easily rendered visible if the solar spectrum is allowed to fall into the upper half of the field of our telescope, while the sodium spectrum occupies the lower half. The bright lines produced by the metal, as fine as the finest spider's web, are then seen to be exact prolongations, as it were, of the corresponding solar lines."

These facts, however, remained altogether barren of consequences, so far as

regards the explanation of the phenomena, except to the bold minds of Angström, Stokes, and William Thomson; the last two of whom, combining the facts with an ill-understood experiment of Foucault's made in 1849, foresaw the conclusion to which they must lead, and expressed an opinion which subsequent investigations have fully borne out. Clear light was, however, thrown upon the subject by Kirschhoff in the autumn of 1859. Wishing to test the accuracy of this asserted coincidence of the bright sodium line and the dark solar lines with his very delicate instrument, Professor Kirschhoff made the following very remarkable experiment, which is memorable as giving the key to the solution of the problem concerning the presence of sodium and other metals in the sun:—

"In order," says Kirschhoff, for I will now give his own words, "to test in the most direct manner possible the frequently asserted fact of the coincidence of the sodium lines with the lines D, I obtained a tolerably bright solar spectrum, and brought a flame colored by sodium vapours in front of the slit. I then saw the dark lines D change into bright ones. The flame of a Bunsen's lamp threw the bright sodium lines upon the solar spectrum with unexpected brilliancy. In order to find out the extent to which the intensity of the solar spectrum could be increased without impairing the distinctness of the sodium lines, I allowed the full sunlight to shine through the sodium flame, and to my astonishment I saw that the dark lines D appeared with an extraordinary degree of clearness. I then exchanged the sunlight for the Drummond's or oxyhydrogen lime-light, which, like that of all incandescent solid or liquid bodies, gives a spectrum containing no dark lines. When this light was allowed to fall through a suitable flame covered with common salt, *dark* lines were seen in the spectrum in the position of the sodium lines. The same phenomenon was observed if, instead of the incandescent lime, a platinum wire was used, which being heated in a flame was brought to a temperature near its melting point by passing an electric current through it. The phenomenon in question is easily explained upon the supposition that the sodium flame absorbs rays of the same degree of refrangibility as those it emits, whilst it is perfectly transparent for all other rays."

Thus it was that the problem of the dark lines in the solar spectrum was solved. The delicacy with which Bunsen detected the infinitely small quantities of strange elements in the spring of Dürkheim was subsequently brought to bear on the analysis of the heavenly bodies by Huggins, Norman, Lockyer, Dr. Miller, and others.* The discovery was the result of co-operation, and the fruit of the seed sown by Sir Isaac Newton. By its means we can acquire a knowledge of the condition of matter at the most stupendous distances from our earth. The sun will first of all engage our attention.

Whence spring the light and the heat of the great centre of our system, the life-sustainer, our fount of energy, our glorious sun? The wonderful results of spectrum analysis coupled with the progress of astronomical inquiries during the last few years yield no doubtful or hesitating answer. The sun is proved to be a great fiery globe surrounded by an atmosphere of intensely heated gases and vapours that are continually rising or falling like our clouds, according to their change of temperature. The willow-leaf-shaped bodies which constitute the dazzling envelope or photosphere are probably foreshortened views of such clouds. During the last total eclipse the red flames, which flare out in some cases as much as from seventy to ninety thousand miles in height above the photosphere, were found to consist of burning hydrogen.

The photosphere itself has yielded on analysis no less than thirteen of the elements — namely, hydrogen, sodium, magnesium, calcium, titanium, chromium, manganese, iron, nickel, cobalt, copper, zinc, and behrium, to pass over others of which there is some doubt. Whether carbon, oxygen, or nitrogen can be added must remain doubtful, according to Dr. Angström and Professor Roscoe, because these constituents of our atmosphere yield a spectrum that is not visible "even between the carbon poles of a battery of fifty cells." Every one of these elements has been found in the meteorites as well as in the earth. That is to say, that the matter from which our light and heat proceed in the sun is identical with that which falls to the earth cold and solid in the meteorite. There is also another important fact to be noted — that in the sun the elements seem to be arranged according to their vapour densities. The red flaming hydrogen, for instance, far outreaches the atmosphere of the other gases, and apparently does not obey the law of gaseous diffusion which is invariable on the earth. This may possibly be brought about by the intensely heated state of the solar elements.

From this brief sketch of the sun all details foreign to the present argument are

* Philos. Trans., 1861-9. Proceed. Roy. Soc., 1861-9.

omitted, such as the different layers of luminous vapour, the solar spots, and the wonderful fiery storms that sweep over the photosphere more swiftly than the wildest terrestrial hurricane. The two facts which have a most important bearing on the ancient history of the earth are that the solar elements are identical with the terrestrial and the meteoric, and that the sun gives light and heat literally because it is on fire. Now we have adduced geological evidence that the earth was at one time molten; is it unfair to illustrate its history from its elemental identity with the sun? May we not look upon it as having passed through precisely the same stage of being as the sun, and as having been a centre of light and heat to its tributary satellites? The analogy rises almost to the dignity of an induction. On the one hand, geology points to a molten globe, which from its very heat must have been clothed with the gases of the metals and other elements not now found in our atmosphere; on the other, astronomy and chemistry show us a globe composed so far as we know it of terrestrial elements, incandescent, and a centre of light and heat. To put the two ideas together seems to us to be no forced union; they are the elements of a concept that transgresses no known physical law, and that agrees with every chemical, astronomical, and geological fact that has a bearing on the question.

If this view be accepted we must look upon the sun as picturing to our eyes what may be called the sun-stage in the genesis of the earth, and we may consider that the present state of the earth is in some degree prophetic of the time when the solar light will be quenched, and its superficial heat so reduced as to admit of those chemical combinations now common on the earth — prophetic of a time when the molten surface will become solid, the fiery clouds be replaced by aqueous vapour, and rain, river, and sea gradually cover up the igneous crystalline surface with sedimentary rocks, and the earth-stage of development be initiated. This argument from sun to earth and earth to sun is founded on premises which are admitted on all sides to be true, while they are scattered through the pages of various writers; they can scarcely be termed false when they are placed side by side and compared. The conclusion is altogether inconsistent with the teaching of the uniformitarians that the only key to the past history of the earth is afforded by its present condition. They expect too much when they tell us to shut our eyes to the truths of astronomy and physics.

The stars also have been proved by spectrum analysis to be constituted very much as our sun, each consisting of "a white hot nucleus giving off a continuous spectrum, surrounded by an incandescent atmosphere in which exist the absorbent vapours of the particular metals." In the star Aldebaran nine elements have been detected by Mr. Huggins and Dr. Miller — hydrogen, sodium, magnesium, calcium, iron, antimony, mercury, bismuth, and tellurium. It is worthy of note that these three latter have not been detected in the sun. In most of the other stars hydrogen has been discovered, and to its conflagration was owing the sudden splendour of a small star in the Northern Crown, which blazed out in 1866, and as suddenly relapsed into its normal insignificancy. The nebulæ consist, some of gaseous matter containing hydrogen and nitrogen, while others give a continuous spectrum which implies that they are composed of solid matter.

In fine, the inevitable conclusion derived from the study of the heavenly bodies — of sun, earth, stars, meteorites, and nebulæ — is that the immeasurable space is full of matter of the same kind, aggregated in different fashions; sometimes being gaseous, at other times solid, sometimes in a state of the most intense heat, at other times cooled sufficiently to admit of the presence of life, as in the earth and Mars, or lastly cold, barren, and lifeless, as in the meteorites. Whether the gaseous condition of matter preceded in any particular case the solid we cannot tell. So far as our earth is concerned, the only idea that we can grasp of its origin is that it was a fiery body like the sun, and that it has been gradually cooling from that time down to the present day. This realization of a steady change is the fundamental doctrine of Evolutionism.

Moreover, if we have sufficient hardihood with Sir William Thomson to look out into the earth's future, the rate of its present loss of heat by radiation implies that the time will arrive, when, like a meteorite, it will become cold to its very core, and when life will cease to be found upon it on account of the low temperature; provided that no collisions with other bodies happen to restore the heat which has been lost. And this exception leads to a mystery. Arrested motion, as Mr. Grove showed long ago, takes the form of light and heat. The motion of the train is visible in the sparks that fly from the break, and the impact of a cannon-ball on an iron target is seen in the dazzling flash, and felt in the heat of both ball and target. In like manner the heat and light of the sun are supposed by Sir William Thompson to

have originated in the arrested motion of cosmical bodies which have fallen into it, and are considered by Dr. Meyer and other eminent physicists to be maintained by the constant gravitation into it of asteroids, meteorites, and planets.

"If the planet Mercury" (writes Professor Tyndall) "were to strike the sun, the quantity of heat generated would cover the solar emission for nearly seven years; while the shock of Jupiter would cover the loss of 32,240 years; our earth would furnish a supply for 95 years."

Whether this mode of accounting for the solar heat be accepted or not, it is absolutely certain that all planetary matter is inevitably gravitating towards the sun, which will be the common bourne of our system. "As surely," eloquently writes Sir William Thomson, "as the weights of a clock run down to their lowest position, from which they can never rise again, unless fresh energy is communicated to them from some source not yet exhausted, so surely must planet after planet creep in, age by age, towards the sun;" not one can escape its fiery end. In like manner the satellites of the planets must inevitably fall into their respective planets.

As then it has been proved by geology that our earth had a fiery beginning, so it is shown by an appeal to the law of gravitation that it will have a fiery end. Nor are we justified in viewing this as a never-ending cycle of change, or as a kind of phœnix life. For if we believe that the sun — the immediate goal of our planetary system — derives its light and heat from the impact of cosmical bodies, there must come a time when it will absorb all these into its own mass, unless we suppose with Kant that fresh matter be eternally drawn within the influence of its attraction, or, in other words, that the "Kosmos of our own system is continually being enlarged at the expense of Chaos," — a supposition that is full of poetry, but not based on any known facts. When this comes to pass it must inevitably gradually lose its light and gradually pass into the earth-stage of development. In all this a progress is clearly shown. The earth passed from the incandescent into the habitable state, and will have its individuality annihilated by falling into the sun, and the same fate will ultimately overtake the sun if it be true that it also is revolving round some enormously distant centre of attraction.

Such as these are the results of modern inquiry in widely diverse fields, in physics, astronomy, and geology. They prove that the earth is united by the closest bonds to the heavenly bodies, and that terrestrial change is one in a definite direction, in a straight line, so to speak, and not in a circle. We have thrown aside all speculative cosmogony and reduced the reasoning as far as possible to the law of a rigid induction. The facts adduced confirm most remarkably the truth of the doctrine of evolution first taught by the great philosopher Kant, and held by some of the ablest thinkers of the present day. It is impossible, in the face of rapidly increasing discoveries in spectrum analysis, any longer to shut our eyes to the condition of extra-terrestrial matter, in considering the past, and the probable future of the earth.

SLEEP AND HABIT.— Sleep is much modified by habit. Thus an old artilleryman often enjoys tranquil repose while the cannon are thundering around him; an engineer has been known to fall asleep within a boiler, while his fellows were beating it out on the outside with their ponderous hammers; and the repose of a miller is nowise incommoded by the noise of his mill. Sound ceases to be a stimulus to such men, and what would have proved an inexpressible annoyance to others is by them altogether unheeded. It is common for carriers to sleep on horseback, and coachman on their coaches. During the battle of the Nile some boys were so exhausted that they fell asleep on the deck amid the deafening thunder of that dreadful engagement. Nay, silence itself may become a stimulus, while sound ceases to be so. Thus, a miller being very ill, his mill was stopped that he might not be disturbed by its noise; but this, so far from inducing sleep, prevented it altogether; and it did not take place until the mill was set agoing again. For the same reason, the manager of some vast ironworks, who slept close to them, amid the incessant din of hammers, forges, and furnaces, would awake if there was any cessation of the noise during the night. To carry the illustration still further, it has been noticed that a person who falls asleep near a church, the bell of which was ringing, may hear the sound during the whole of his slumber, and be nevertheless aroused by its sudden cessation. Here the sleep must have been imperfect, otherwise he would have been insensible to the sound. The noise of the bell was no stimulus; it was its cessation which, by breaking the monotony, became so, and caused the sleeper to awake.— *Macnish.*

From The Spectator.

MADAME ELISABETH.*

THE memory of Madame Elisabeth had almost faded from the minds of this, the second generation born since her tragical death, when the publication of a volume of her letters roused considerable interest among the lovers of historical biography, and gave life and colour to the dim figure which had vanished in the gloom of the Temple, and whose very tomb it had been impossible to identify. In Cléry's memoirs, and in prints and pictures relative to the family group which met so awful, and personally so undeserved a fate, Elisabeth appears as the gentle supporter of her brilliant sister-in-law; but until M. Feuillet de Conches published her correspondence with certain of the ladies nearest to her person, and closely allied to her by friendship, she could scarcely be said to have for us a substantive existence. Since then, the two thick volumes given to the world by M. de Beauchesne, and bearing date of last year, give as complete a picture as can be desired of a very admirable nature, firmly built, and capable of achieving a separate reputation for itself, but for the simple directness of purpose which caused it to utterly disregard all praise and all social success.

The Court of the Bourbon Kings of France at all times contained the most singular diversity of character within the bosom of the Royal family itself. Something in the blood seemed to run to extremes of virtue or of vice. Louis XIV., after a life of very lax morality, ended by an old age of strict devotion; his son, the Grand Dauphin, was a non-entity, but his grandson, the Duc de Bourgogne, Fénélon's pupil, inspired the highest hopes from the virtuous promise of his youth. His early death and the long minority of the boy Louis XV., under a vicious Regent, prepared the fatal reign which was to cost France all her chance of steady national development. But nothing in authentic history is more amazing and more touching than the contrast of the two lives led at Versailles by Louis XV. and by his wife and children. Marie Leczinska, daughter of Stanislaus, the dethroned King of Poland, was a truly good woman; whether she was also a sensible one is a difficult matter to judge of. Her portraits are very characteristic, showing a plain face, *nez retroussée*, and eyes of considerable intelligence. But even supposing she was narrow and bigoted, as the Liberal writers of the period affirmed, her husband was enough to make her so. She could but stiffen herself against the flood of immorality surging about her; and a hard lot was hers, for it appears true that in the beginning of their married life her husband was really attached to her, and that, like many weak affectionate natures, the beginning of evil had for him no end. It was a miserable Court intrigue which first plotted the young king's moral ruin, and from thenceforth Marie Leczinska had to uphold her own dignity and the purity of her family circle against fearful odds. She had eight daughters and one son. Of the daughters, one married a prince of Spain, another became a Carmelite nun, two or three died, the others grew to middle age at Versailles. When the Revolution came two were still living, Mesdames Adelaide and Victoire. They got away to Rome with some difficulty, were received with open arms, and there, in an old Roman palace, they spent their remaining years. Marie Leczinska's only son, the "Good Dauphin," died of consumption at the age of 36. This man was so strangely unlike his father, was so religious, so industrious, so single-hearted, that one wonders as one reads of him what special providence had guarded him in that terrible atmosphere of the Court. He was the father, by Marie Joséphe de Saxe, of many children, three of whom were Kings of France. Elisabeth was the youngest, and had lost father and mother before she was four years old.

The poor little child thus left lonely was so delicate that small hopes were entertained of rearing her. She was given, with her elder sister Clotilde, into the hands of Madame de Marsan, the Royal governess. Clotilde was nearly five years the oldest, and one of those good little girls with whom everything goes well. She lived to espouse the Prince of Sardinia, to be a wanderer over Europe in the times when the old Legitimate thrones were subverted, and to be finally entitled "venerable" by the Catholic Church. But in proportion as Clotilde was good, Elisabeth was naughty. Passionate and obstinate was this Royal Mite, scolding her maids, and declaring that princesses need not tease themselves to learn, as they had always somebody to think for them. In Marie Antoinette's letters, she makes kindly mention of this little sister-in-law, who was intelligent, but so unmanageable. The child was jealous of Clotilde because it was natural that Madame de Marsan should prefer the tractable pupil, but the eldest sister lavished all her tenderness upon the younger one, and was the first strong influence which bore upon Elisabeth for good. In the year 1770, Clotilde made her first

* *La Vie de Madame Elisabeth; Sœur de Louis XVI.* Par M. A. de Beauchesne. Paris: Henri Plon.

Communion, and according to the etiquette of the French Court she quitted on that day the simple dress of her childhood, and put on the stately attire of a princess, cushioned and powdered hair, hoop, stomacher, and the *tout-ensemble* of the time to which we are accustomed in Sir Joshua's pictures.

Her governess, anxious to change the little Elisabeth's natural difficulties into the virtues which lay near akin, now sent for a widow lady, once a pupil at St. Cyr's, then living in retirement at Alsace, to assist her in her charge. Not only had Madame de Mackau a firm and commanding character, by which to work on Elisabeth's sensible but obstinate nature; but she had one young daughter of her own, two years older than the one and younger than the other princess, and the three were henceforth educated together under a strict maternal rule. This daughter became Madame de Bombelles, Elisabeth's dear friend in youth, and constant correspondent when later life separated them. It is by this friendship that the memory of both survives in its freshness.

The three young girls received a good education. It was the time when the Galtons at Barr, and the Edgeworths in Ireland, and Mr. Day in England, and many others whose projects have been less known, were all alive energetically to the necessity of good teaching. Accordingly, we find the same current in the Court of France. Elisabeth learned botany from the King's physician, Lemonnier, a remarkable man; she read Plutarch, and acted little plays, besides, of course, being taught all the regular routine. She often went to visit the young ladies of St. Cyr, and her childhood passed happily up to the year 1777, marked by two great events, her own first communion, and the marriage of her sister Clotilde. It was the Count de Viry (married later to an English wife, the daughter of Lord Sandwich, and sister of the eminent barrister Basil Montagu) who came to fetch the young bride. She bade a formal adieu at Versailles to the King and Queen, but Elisabeth went with her as far as Choisy, and her brother also followed privately. On the 28th of August they both parted from their Clotilde. She never saw either of them again. Elisabeth fell ill of grief, and Marie Antoinette wrote to her mother that she feared learning to love the child too much, "since I feel for her sake, and taking warning by my aunts, that it is essential that she should not remain to be an old maid in this country."

When Elisabeth was about fifteen, projects of marriage were afloat for her. Portugal was seriously talked of, but the negotiations came to nothing. Then the Duc d'Aosta was proposed, but French pride objected to marrying a daughter of France to a younger son. Lastly, the Emperor of Austria, Joseph II., was said to have greatly admired her when he paid a visit incognito to his sister the Queen, but the anti-Austrian party at Court prevented any result. Nor did Elisabeth ever seem to have an anxious moment in regard to herself and her establishment. All her letters show her living for others, wrapped up in their interests and acting as counsellor and friend. Mademoiselle de Mackau, married to M. de Bombelles, Mademoiselle de Causaus, who became Madame de Raigecourt, and the young and lively Mademoiselle de la Briffe, who became the Marquise de Moutiers, were her three intimates. The last was her "cher demon," alternately petted and scolded by the Princess, and the constant object of an almost maternal solicitude.

The King, in the year 1781, bought from the Princesse de Guéméné a small estate on the outskirts of Versailles, named Montreuil; and gave it to Madame Elisabeth for her own, on the condition that until she had attained the age of twenty-five she was to continue to sleep at the palace. She was enchanted with her new acquisition, went there with her ladies early every morning, worked, read, walked, and looked after the poor; and after family prayers in common returned in the evening to Versailles. She spent much time in this, her own home, during the next nine years; the place still remains, almost in its former state, and belongs to a proprietor who respects the memory of the Princess sufficiently to take a pleasure in preserving the relics of her residence as intact as possible.

M. de Beauchesne has accumulated in regard to these years a quantity of correspondence, anecdotes, and political matter. He reproaches the King for want of firmness, and says that on the first occasion of the invasion of Versailles, Elisabeth counselled the repression of the insurrection by force. She was undoubtedly in the right. At that moment, when the nobles were giving up their privileges, and the King was amply disposed to take the place of a constitutional monarch, the Government ought certainly to have enforced tranquillity with the strong hand of power. It was sheer weakness to let the constitutional party be over-ridden by the roughs. Priceless as may be the substantial changes in the law wrought by the great Revolution, they were brought about *unnaturally*, and after a lapse of seventy years the Gov-

ernment of France at the present day is so utterly rootless a thing, that the first wind bringing disease and death upon its wings may cause its overthrow; while local liberty, and the natural premiums on local activity which in England are of the very essence of our political life, are cut down so low that one doubts if they ever can be efficaciously revived again.

It is in its vivid portraiture of pre-revolutionary times that the *Life of Madame Elisabeth* has its chief interest for us. The story of the imprisonment of the Temple so pathetically told in its freshness by the valet Cléry, is familiar to us all from childhood, and so are the previous acts of the departure of the Royal family from Versailles, taking seven hours for the weary route, and their fruitless flight to Varennes. M. de Beauchesne says that on leaving Versailles, Elisabeth leaned out to catch a last glimpse of the tree-tops of Montreuil, and when playfully said by the King to be saluting her home, answered, "Sire, I am bidding it adieu." In fact, from the beginning of the troubles Elisabeth seems to have had a prescience of the end. She had bade adieu to Madame de Bombelles while still at Versailles, her friend being called to join her husband in Germany. "Had I known," said Madame de Bombelles, later, "that I should never have seen her again, I should have fallen dead at her feet." When lodged in a semi-imprisonment at the Tuileries, then a desolate place, full of gloomy old furniture, and uninhabited since the early part of the reign of Louis XIV., Elisabeth will not hear of Madame de Raigecourt, who is *enceinte*, coming to share her danger. So long as pen and ink are left to her, she writes to "mon cher demon" with her usual sweetness. But there is no hint of hope in her letters. Yet her only complaint is of being lodged on the ground-floor looking into the court, where the mob came and stared through the windows, and several market-women even broke in. The King moved her into the Pavillon de Flore, which she occupied for many months. It is now taken down, and a huge new pavilion erected, said to be destined for Napoleon's private rooms. So long as it existed, it was often pointed to as the scene of Elisabeth's sad sojourn. Even the market-women called her "the St. Geneviève of the Tuileries." Of her many heroisms, of her throwing herself in front of Marie Antoinette, exclaiming, "I am the Queen!" when the mob were striking at her sister; of her comfortings on the dreadful night when the Dauphin was taken away out of his bed; of her partings from brother and brother's wife, and all the rest of the piteous tale, nothing is to us so pathetic and so genuinely good as her sedulous *cheerful* care of the young niece who was for many months her sole charge. In later life, Madame d'Angoulême said that her aunt never broke down, never complained, never suffered her to be idle through all those dreary days. One feels it must have been owing to her that the young girl's reason kept steady on its throne. At length, one night, came the officers again; and this time they took Elisabeth away (it was in May, 1794), leaving the unfortunate child to the horrors of solitude.

The Princess was tried and condemned at the Conciergerie for various imaginary crimes; inciting massacres, teaching her nephew to hate and revenge himself upon the people; and so on. Twenty-three men and women were condemned on the same day. When taken to the guillotine, they were seated on a bench, and summoned one by one; Elisabeth last of all. Each woman asked to kiss her, each man came up to her and bowed. The scene is described by a concierge, who stood close by, and another woman told of the wonderful prayers and consolations by which the Princess strengthened her fellow-sufferers. Two were lads of twenty, one of whom had his mother with him. Close by the guillotine stood a cart with two immense panniers: the heads were put into one, the bodies into the other. Elisabeth's, dressed in all its clothes, was at the top. The cart was driven away past the Madeleine, where the cemetery was full, by the Rue St. Lazare, and up the Rue du Rocher, to a field near the Parc Monceaux, where many victims already lay and many were yet to come. Malesherbes and several members of his family had been guillotined some days previously, and Danton with fourteen of his party were there. Arrived at the cemetery, or rather field, for a part of the ground still retained traces of the furrow and the spade, the bodies were stripped, and laid in a large fosse, with about six inches of earth between. The digger intended to take special note of where he laid the corpse of Madame Elisabeth; and at the Restoration various depositions were taken in the hope of identifying and removing her remains. But, as may be imagined, it was found to be impossible; and Louis XVIII., sceptical by disposition, and not feeling very certain that the bodies so solemnly removed to St. Denis were veritably those of his brother and Marie Antoinette, ceased from endeavours to certify that of his sister Elisabeth. It would have been

only natural to have set aside the whole piece of ground as a memorial, to have planted it with trees and flowers, and consecrated it to the illustrious dead. Strange to say, this was not done. The horrors of the guillotine and the sorrows of exile had broken through the habit of tender respect which the French pay to the grave. In many cases, relations did not even know to which one of the cemeteries of Paris the victims of a particular day had been taken. This particular piece of ground, which went originally by the name of the *Champ du Christ*, had been closed at the end of two years, and the great gate opened in the town wall to admit the carts had been built up. The place had sunk into silence and oblivion, and when it was found impossible to identify Madame Elisabeth, it was allowed so to remain. After a further lapse of years part was sold; buildings were erected on speculation, and when bones were dug up among the foundations, the inhabitants of the Faubourg could not imagine whence they came; all memory of the Revolutionary graveyard had passed away. Lately, in making the upper part of the Boulevard Malesherbes, a quantity more bones were found. These were carefully removed to the catacombs. This is all that can ever be known of the grave of Elisabeth.

We turn to the dire sorrow caused by her death. When the Prince of Piedmont learnt what had happened, he went to his wife, holding a crucifix in his hands, and said, "It is necessary to make a great sacrifice." Clotilde, who had so loved her little sister, and who must have suffered agonies of suspense during the long imprisonment of the Temple, guessed in a moment what he meant. Rallying her courage, she answered, "The sacrifice is made," and fell fainting at her husband's feet. On that day a religious ceremony was appointed to take place. It was proposed to postpone it; but Clotilde came to herself, and insisted on going through with it, and walked dry-eyed to the church, praying as she went, while the people who saw her pass wept from compassion. A servant walked close behind, fearing she would fall; but she went steadily through the whole, until on her return to the palace she took to her bed. It is a little trait of the strange firmness of the women of that generation.

At Wartegg, in Switzerland, were the family of the De Bombelles. A newspaper brought the news, which flew like wildfire through all the castle. Its mistress had not left her room; and a servant came in, uttering with tears the words, "Madame Elisabeth!" Madame Bombelles cried out, and fell back motionless on her pillow. Her husband ran into the room, brought back breath and motion, but only to hear her break into a fearful fit of laughter. M. de Bombelles cried out, "The children, the children!" The little things ran and flung themselves on to their mother's bed; and gradually the laughter changed into sobs. Madame de Raigecourt and Madame de Moutiers, the two next dearest to the dead princess, wrote, one to the niece, the other to the brother. The answer, dated from Vienna, of Marie Thérèse, and the reply of Louis XVIII. to his sister's "cher demon," are both given. They are stiff in wording, but human language deals ill with catastrophes which surpass ordinary human experience. Those who frequently saw Madame d'Angoulême in later life, say that though excellently kind and good, she never lost a certain abrupt harshness of manner, as if the springs of grace had been early broken by the frightful sorrows she had undergone.

Here we leave M. de Beauchesne and his task. We have preferred to analyze the contents of the book, rather than to give translated extracts, which would lose their savour by losing the clear, expressive French in which Elisabeth wrote. These two volumes are a book for a permanent library; they are also a book for the young, since the story which they tell is as noble as any of Plutarch's lives. It was no ordinary spirit which, when confronted, after long months of depressing imprisonment, with a row of accusers and judges, twenty in number, and asked her name, replied with quietness, "I am named Elisabeth Marie de France, sister of Louis XVI., aunt of Louis XVII., your King."

ARTIFICIAL LIGHT. — According to Landsbergh, a German chemist, artificial light contains 90 per cent. of calorific rays, while sunlight contains only 50. To this predominance of heating power as compared with illuminating power in artificial light, he attributes the disagreeable sensation produced upon the eyes. Very thin sheets of mica will intercept the calorific rays, and render the light more agreeable.

From The Spectator.

POEMS ON NATURAL HISTORY.*

THIS is, perhaps, one of the drollest legacies ever left to the world by a man of science. Dr. Daubeny was a great chemist, and as it is truly said in the introduction, his whole life was devoted to science and literature; but it must surely have been as a joke and with an inward chuckle, not in sober earnest as his friends would intimate, that he collected the materials now offered to the public. The contents form the oddest medley imaginable. Many a poet or verse-maker who happens to have sung of any natural object on the earth, under the earth, or above it is made to do duty here, and Dr. Daubeny "has added some flowers of his own to the wreath contributed by his friends." It is intimated that "by carrying out his intention Literature and Science may be made to join hands in furnishing some amusement and instruction." That half this wish will be gratified we do not doubt, but the "instruction" to be gained from these *Fugitive Poems* is not so obvious.

The best portion of the volume contains specimens of ingenious trifling by certain doctors and professors, living and dead, wise enough to enjoy nonsense. Professor E. Forbes, for instance, sings of "the jolly young trilobite," and among other contributions has an ornithological romance on "The Fate of the Dodo," one stanza of which may suffice:—

"Do-do! Monsieur de Blainville,
Who hits very hard all the nails on his anvil,
Maintains that the bird was a vulture rapacious,
And neither a wader nor else gallinaceous:
A do-do! a do-do!
And not a cock-a-doodle-doo."

A Mr. Field writes a merry piece full of hard words "that would have made Quintilian stare and gasp" on the new chemical nomenclature. Here are the concluding lines:—

"Time was when Triethylamine seemed long,
And Phosphammonium all unfit for song,
When the soft sound of Aniline was dear,
And fell like music upon Hofmann's ear;
But now, alas! the modest Aniline
Becomes disguised as proud Phenylamine;
And the long names too difficult to tell,
Which none can read with peace and few can spell,
Expand, each meeting as the months go by,
In letters alphabets can scarce supply,
Until at length the gasping chemists come
To methyl-ethel-amylo-phenylammonium."

Here, again, is a rhyme for Darwin, by an anonymous poet: —

"In million ages lions grew from cats,
In million ages seals fined down to sprats;
And black bears dabbling in the sea for play,
Lapsed into whales, and grandly swam away."

And here is a suggestion for Sir Charles Lyell, the opening sentence of whose Geology Professor Ramsay undertakes to versify: —

"Then Lyell tries to teach us — that geological magician
Who'll raise the Alps, depress them, and so alter their position —
That though a hundred miles across he'll prove how short it takes,
By a very light depression, to make as many lakes
As would fill these ancient basins
Formed far back in olden times.

"Yet I shouldn't be at all surprised if in his next edition,
Instead of altering the Alps, he changed his own position;
For authorities seem getting strong that ice alone would make
A better tool than any other for gouging out a lake,
To fill these ancient basins
Formed far back in olden times."

There is a "Dialogue between Dr. Buckland and a Rocky Boulder," which the geologist is supposed to commence by asking,

"Say when and whence and how, huge Mister Boulder,
And by what wondrous force hast thou been rolled here?"

To which the Boulder replies that it was torn from the mountain by a red-hot comet and borne away upon a massive iceberg. If the Doctor doubts the fact, he is recommended to

"go with friend Agassiz
And view the signs in Scotland and Swiss passes."

The famous geologist is made to talk to himself as well as to boulders, and Dean Conybeare represents him as singing "On the Hyænas' Den at Kirkdale," after the following fashion— :

"Some may love potted venison and hare,
Potted char may of some stir the blood,
But no dainty to me is so rare
As hyænas' bones potted in mud.

"I know how they fared every day,
Can tell Sunday's from Saturday's dinner;

* *Fugitive Poems Connected with Natural History and Physical Science.* Collected by the late C. G. B. Daubeny, M.D., F.R.S., F.G.S. London: Parker and Co. 1869.

What rats they devoured can say,
When the game of the forest grew thinner.

. . . . . .

"Mystic cavern! the gloom of thy rock,
Shedding light on each point that was dark,
Tells the hour by Shrewsbury clock
When Noah went into the ark.

"By the crust on the stalactite floor,
The post-Adamite ages I've reckoned,
Summed their years, days, and hours, and more,
And I find it comes right to a second."

"The Last Hyæna," unlike Campbell's "Last Man," has but a word or two to utter before his departure: —

"'My skull to William Buckland I bequeath:'
He moaned, and ocean's wave he sank beneath;"

— a result which need not surprise us, for the beast, according to his poet, Mr. Duncan, had been previously gormandizing to a frightful extent: —

"With fratricidal, parricidal jaw,
His rage had each cotemporary slain,
Cracked every bone, sucked marrow, spine, and brain."

In a book like this, with its poetical effusions upon boulders, quarries, granitogony, ozone, and beetles (the poet of the beetles, by the way, is Mr. Martin Tupper), it might seem vain to look for any songs of the heart. Nevertheless, a palæontologist ventures to write a valentine, the first and last stanzas of which we offer to our readers: —

"Borne upon Pterodactyle's wing,
This heart which once you deemed of stone,
Model of maids, to thee I bring,
And offer it to thee alone!
Not Owen pondering o'er bone
Of great Dinornis, fonder grew
Of mighty, wingless birds unknown
Than I, sweet maid, of you.

. . . . . .

"Like some fantastic trilobite
That perished in Silurian sea,
And long lay hid from mortal sight,
So was the heart I yield to thee.
Now from its stony matrix free,
Thy palæontologic skill
Once more hath called it forth to be
The servant of thy will."

We have given our readers a slight taste of the mirth and "instruction" provided in this volume, but it may be as well to add that Dr. Daubeny (of whose original contributions, on a cat and on economical cookery, we cannot speak highly) enlists in his cause a number of contributors who look strange enough amidst the doctors and professors by whom they are surrounded. We have already hinted that Mr. Tupper has a poem on Beetles: " —

"Beetles in Nilotic mud,
Beetles from the bright Azores,
Beetles new on British shores,
Beetles older than the flood."

And in addition to the author of *Proverbial Philosophy*, we find, among others, the names of Cowley, Akenside, Yalden, Parnell, Sydney Smith, and *Punch*, from whose pages is taken an "Elegy on the Porpoise," one of the most humourous poems of the kind that has appeared for many a day, even in the columns of our "Charivari."

THE NEW NIGHT TIMEPIECE. — This curious and ingenious invention, says the *Queen*, may be said to be a combination of reading-lamp and clock. In external contour the light timepiece resembles an ordinary table-lamp of the globe form of construction; but surrounding the globe as a zone or band are the figures representing the twelve hours of a common dial. A blue steel hand or index, which appears black when the lamp is lit, points to the hours and minutes as they are registered by the clockwork, which occupies a round box or case below the oil reservoir. This consists of a deep glass chamber or cup, in which a hollow porcelain ball floats, holding on its upper surface a short waxed cotton wick. On the glass cup being filled with oil the wick is ignited, just as in the case of a common floating night-light. The works are then wound up, the time set, and the night timepiece is on duty. It is so arranged as to run for thirty hours without fresh winding-up. Should the movement be slow, or tending to gain, there is a little ball at the end of the pendulum which, by being turned from right to left, corrects the evil. If it loses, the ball must be turned in the reverse direction. Nothing can surpass in simplicity the arrangement under consideration, which we are of opinion will be found of great value to invalids and those whose occupations oblige them to mark the flight of time by night as well as by day.

From The Fortnightly Review.

JANE AUSTEN.

We are often told at the present day that our grandfathers and grandmothers in their youth had a less uniform and monotonous existence than their degenerate posterity; that life was more full of both character and incident than it is at present; that idiosyncracies of all kinds, personal, professional, or provincial, were more strongly marked; and that among our progenitors, consequently, though much less laborious than ourselves, we find no complaints of that insipidity and sameness which are, rightly or wrongly, imputed to contemporary society. No doubt the life of England eighty years ago was rougher than it is now; and in some respects, therefore, more exciting. Doubtless, also, to us looking back upon it, mellowed and moss-grown with the lapse of time, it seems more picturesque than the present. And so far it may be a more proper period than our own in which to lay the scene of a romance. But it may be doubted, after all, whether the real actors in the life of that generation were as conscious of their own advantages as the complaint against our own times assumes them to have been. All that part of life which was rougher and more stirring than our own, lay outside of their ordinary daily experience; and it was all external and out-door life. Posting, coaching, or riding were, let us grant, more interesting modes of travelling than our own, though any one of them could be tedious enough under circumstances of no rare occurrence; but they did not affect the ordinary routine of domestic life. The very same circumstances which lent all its charms to the "road," kept down the number of those who were able to enjoy them. People then remained at home to an extent that would now be unendurable. So that, on the whole, we cannot avoid a shrewd suspicion that life in those days, if less insipid than in these for the higher aristocracy, was more dull for the rest of the community; that long stretches of unbroken monotony, days of worsted work and nights of satin stitch, were more common, and that if a young lady of 1870 were to find herself transferred to a country parsonage of 1790, she would consider herself to be buried alive.

This conjecture, which is *à priori* not improbable, is strengthened by the perusal of Miss Austen's novels; and it is part of her genius that, without ever travelling out of the same dull circles of society, she has been able to construct for us tales of such enduring interest. It is still farther strengthened by the contents of her biography, which presents us with a life not only entirely devoid of all the exciting incidents that might happen at the present day, but passed in a contracted sphere, with limited opportunities of observation, among common-place people, who knew little variety even in their amusements. The very narrowness of her range enabled her to concentrate her intellectual vision upon the few types of character which she did meet, with an intensity for which no more extensive experience could have compensated, had it lessened this peculiar power. These are the differential qualities of Miss Austen's novels — a series of characters which, for the knowledge of human nature and the delicacy of finish displayed in them, have been compared perhaps rashly to Shakspeare's, unfolded through a series of events which are almost as uninteresting as the Citizen's Journal in the *Spectator*. This is a wonderful triumph of art. Yet it is equally clear that excellence of this kind is no passport to extensive popularity. On the whole, Jane Austen has probably been as much admired as in the nature of things it was possible she should be. Lord Macaulay and Archbishop Whately have done for her reputation all that the most influential criticism can accomplish. And all we can expect is, that the recent biography will stimulate attention to her writings among those who admire them already, without communicating it to the general mass of novel readers.

Miss Austen was the daughter of a country clergyman, who was rector of Steventon in Hampshire from 1764 to 1801. Her mother was a Miss Leigh, likewise the daughter of a clergyman, and a connection of the Leighs of Stoneleigh. On the father's side, too, the family is said to have been gentle, though in the beginning of the seventeenth century its representatives were Kentish clothiers. At all events, it had good and opulent connections, and through these Mr. Austen obtained his preferment. His daughter Jane was born at Steventon on the 16th of December, 1775; and here she lived till the year 1800, when Mr. Austen, finding himself too infirm for duty, resigned his living to his son. The family retired to Bath, but only for a short time. After her father's death, they lived a little while at Southampton, but finally settled down again in the country at Chaneton, a Hampshire village about a mile from the town of Alton. "While Jane was at Bath and Southampton," says her biographer, "she was a sojourner in a strange land;" *here* "she found a real home among her own people." But it is evident that, during her stay at Bath, she was watching the life of the

place with a curious and observing eye, which enabled her afterwards to reproduce it with so much effect in "Persuasion" and "Northanger Abbey." Still her main sources of inspiration lay round Steventon and Chancton, among the beneficed clergy and the county families, which constituted the society of the neighbourhood. At Steventon her aunt's family lived quite in the style of the clerical squire. The living was a family living. The patron owned the whole parish; and as he never resided there, his place in the eyes of the village was filled by the rector. Mrs. Austen had her carriage and pair. The sons shot over the manor. Dinner-parties were exchanged with the best society in the neighbourhood. And though, as Mr. Leigh points out, carriages did not then imply so high a scale of honour as they do now, still it is clear that, on the whole, the Austens were in a thoroughly good county position; and that the Bertrams, the Tilneys, and the Dashwoods, with which she was to charm the world, were the result of her personal experience. That sombre and opulent and respectable society, rich and dark like a twelfth cake, is no longer exactly what it was. But it still exists in a tolerable state of preservation, sufficient to enable any reader who was mixed in it to reproduce for himself, without any great stretch of the imaginative faculty, the drawing-room at Mansfield Park.

It was during her residence at Chancton, that is, between the years 1809 and 1817, that all her novels were published. But she had written three of them — namely, "Pride and Prejudice," "Northanger Abbey," and "Sense and Sensibility," before leaving Steventon — that is, before she was five-and-twenty. The first of these, offered to a London publisher, was declined by return of post. The second was sold to a bookseller at Bath for ten pounds, who, like poor Goldsmith with the "Vicar of Wakefield," kept it by him some years without venturing to publish it, and ultimately, on receipt of his purchase-money, returned it to the lady's brother, who had the pleasure of informing him that the rejected work was by the authoress of "Pride and Prejudice." The chronological order of her works was as follows: "Sense and Sensibility," published in 1811, "Pride and Prejudice" in 1813, "Mansfield Park" in 1814, and "Emma" in 1816. "Persuasion" and "Northanger Abbey," but lately recovered from the undiscerning bibliopole, appeared after her death. This event took place in 1817, at Winchester, where she had gone for medical advice; but her nephew does not tell us to what kind of disease we are to attribute her premature decay. She had not yet completed her forty-second year when the grave closed over her; a singular exception to her three celebrated contemporaries, Miss Burney, Miss Edgeworth, and Miss Mitford, who all attained extreme longevity.

In person Miss Austen must have been at least pretty; she was brown-haired, blue-eyed, and slightly above the average height. She may be said with literal truth to have passed through life "in maiden meditation, fancy free," though she was probably not permitted to escape the importunity of lovers. We can imagine her sometimes to have undergone much what Emma Woodhouse experienced from the attentions of Mr. Elton, when that reverend gentleman had taken just enough wine to embolden without confusing him. But whatever her acquaintance with the tender passion, it is clear that she was the idol of a large family circle. "Aunt Jane" was the universal resource and referee in all domestic matters. She counselled the improvident, nursed the invalid, sympathized with the lovers, and told fairy tales to the children, like a second Scheherazade. She was evidently a cheerful, good-natured, contented young woman, satisfied with life as she found it, exempt from its depressing cares, and unconscious of its deeper problems. The placidity of her temper, the soundness of her mind, and her total freedom from egotism, are shown by the fact that she wrote all her novels at a little desk in the common sitting-room of the family, exposed to constant interruption, yet never for a moment ruffled, or leading any one to suspect that she was occupied with business of importance. It is indeed not improbable that she was rewarded for her self-possession by finding that many of her morning visitors were qualified to serve as models; and that, while she seemed to be listening with ready politeness to the gossip of some village bore, she was quietly taking his likeness, and forming in her own mind a Mr. Collins or a Miss Bates. In her habits and tastes she was simple, quiet, and unobtrusive. Her neat-handedness was proverbial. She was a mistress of needlework; unrivalled at "spilikins" and cup and ball; and celebrated for her nicety in the folding and sealing of letters. Consistently with these traits, she seems to have led an indoor and rather hot-house kind of existence. We see no traces in her books, and none are supplied by the biographer, of that love of nature, and of out-door exercise, that fondness for flowers, birds, dogs, and all

kinds of domestic pets, which distinguished Miss Mitford. Aunt Jane, we should think, was one of those ladies who took a constitutional every day round the garden, wearing pattens when the ground was damp; who liked dogs very well in their places, as if any place could be too good for them; and thought a nicely set-out tea-table, with a clean hearth and a clear fire, worth all the scenery in Hampshire. In all her novels we can recall only a single passage which betrays any of that sympathy with the varying moods of nature, so abundant in the younger authoress, and which modern poetry has recently revived among us: Anne Elliot, we think it is, in "Persuasion," who is sorry to leave the country in autumn because of the "pleasing sadness" with which that season of the year affects her.

No doubt Miss Austen belongs essentially to the eighteenth-century school of literature. There is little we should now call romance in any one of her six novels. They are good genteel-comedies. They play over the surface of life, and represent its phenomena with the most finished elegance. But they do not stir the deeper passions, or more tumultuous emotions of our nature. We should question if a single page that Miss Austen has written has ever moistened the eyelid of the most impressionable man, woman, or child who has lived since she first began to write. On the other hand, the quiet fun, the inexhaustible sly humour, the cheerful healthy tone, the exquisite purity, and the genuine goodness which are reflected in every line she wrote, carry us down the sluggish stream of her stories without either weariness or excitement, and with a constant sense of being amused, refreshed, and benefited. In these respects she has been compared to Addison. And we think the comparison a just one. If the reader will refer to Mr. Thackeray's essay upon Addison in his "Humorists of the Eighteenth Century," he will get, in our opinion, all due allowance being made for the difference of sex, age, and circumstances, no bad idea of Miss Austen. Many of her characters, too, are but country-bred editions of the flirts, and prudes, the "pretty men," and the conceited prigs who pass before the Silent Gentleman. The social circle from which her characters are taken has already been described. She never sought to go beyond it, neither peer nor peasant ever figures among her select *dramatis personæ*. In this particular excellence but one English novelist is her rival; and, of course, the resemblance between Miss Austen and George Eliot has been the theme of every critic who has lately written upon the subject. But it has not been sufficiently observed that the common-place people whom George Eliot turns into characters, are not common-place in quite the same sense as Miss Austen's. They may be equally so absolutely, but they are not relatively. A Mr. Bennet, a Mr. Woodhouse, a Mrs. Norris, or a Mrs. Allen, a Catharine Morland, an Eleanor Dashwood, are characters, not only common enough in themselves, but common to the experience of all educated people. A Mrs. Poyser, a Mrs. Pullet or Mrs. Tulliver, a Mr. Macey, or Dolly Winthrop, are not. In making use of such characters as these George Eliot has all the advantage which the odd has over the familiar; the grotesque over the simple. Whether farmers, and peasants, and their wives would appreciate these characters, as we ourselves appreciate them, is a question that can never be solved. If they were sufficiently educated to appreciate such literature at all, the likeness would be lost, and the condition of the experiment be cancelled. If we allow that George Eliot is entitled to the benefit of the doubt, we must allow equally that in Miss Austen's case there is no doubt about the matter. And the conclusion is that the interest which an educated public feels in the Poysers, the Pullets, and the Maceys, is not proved to be the result of such high art as that which he feels in the Bertrams, the Bennets, and the Allens.

George Eliot can afford to make this concession to a sister novelist. Of all the ladies whose genius has enriched the highest fiction she is confessedly the first. In depth of feeling, in breadth of sympathy, and strength of imagination, she is as superior to Miss Austen as poetry is superior to prose. But the prose has merits of its own. And if Miss Austen's "two inches of ivory" sometimes show a delicacy of touch which her great successor has not beaten, why should we grudge her the acknowledgement? To refuse her due, if it be her due, is no compliment to George Eliot, who has a thousand other claims upon our homage.

It was a necessity of Miss Austen's method that her plots should be less interesting than her persons. In fact, of the plot regular, with a mystery, an explosion, and a reconciliation, she presents no specimen; and our curiosity, we must own, is but faintly stimulated by the doubts and fears which beset her heroes and heroines *en route* for the altar. And it is a most remarkable circumstance that there is no other interest in her novels but what arises out of a passion

to which she was herself a stranger. So many young men and so many young ladies stand up in couples as if they were going to dance a quadrille, and the various entanglements which await them form the whole action of the piece. Now one goes wrong, and now another, sometimes with serious, but oftener with comic, consequences. A few dresses are torn, and once a lady has a fall. But there are no bad hearts, and all winds up comfortably with the usual refreshments. Crime, calamity, and anguish enter not this placid sphere. Tragedy is not allowed to show even the tip of her buskin. Poverty and disgrace are hinted at, but, like murder, are excluded from the stage. In three words, the story is redolent always of the quiet respectability, the prosperous dulness, and the ignorance of passion which encircled Miss Austen's existence, and narrowed the range of her experience. But as soon as her personages begin to talk and unfold their own characters to our gaze, we cease to care how they act, how they are situated, or what is in store for them. The exhibition of human nature, unadulterated by sensational incidents, is the purest of treats. And that is what she gives to perfection.

To those critics who would ask us what moral purpose Miss Austen proposed to herself in these delineations of common-place society, it is perhaps enough to reply that every picture of human life, however trite or conventional, must have a moral of its own if we have only eyes to see it. Without plunging into any such profound question as the ethics of art in general, we may affirm that nearly all Miss Austen's novels have a very plain moral, and one that admits of easy application. All of them have a family likeness, and a general tendency to bring out into prominent relief the peril of being guided by appearances. The danger to which a young lady is exposed by imagining too readily that a polite gentleman is in love with her; and the danger to which a young gentleman is exposed by imagining too readily that a good-natured girl is in love with him; the misunderstandings that arise from careless conversation, from exaggerated reserve, from overrated pretensions, from all the little mistakes which create the common embarrassments of ordinary society; these are the minor mischiefs which her pen is devoted to setting in their proper light, and no man or woman turned forty will deny that such work may be of great utility, or that anybody who chooses to read her novels with a view to practical instruction may learn a great deal from them. Our space will not allow us to illustrate these remarks by examples. But we refer our readers more particularly to "Emma" and Persuasion" in confirmation of the truth of them.

We have yet to mention two of Miss Austen's most characteristic excellencies — her dialogue and her style. In regard to the former we must of course remember what a vast change in this respect has passed over society since she wrote. For all that, the dialogues in Miss Austen's novels strike us as much more natural than the dialogues in Richardson's upon whom she had apparently endeavoured to form her own. But her genius was too strong for her. She wrote, moreover, only upon those scenes of life with which she was perfectly familiar; whereas, Richardson was in total ignorance of the habits and conversation of that society which it was his ambition to describe. There is something very quaint about the conversations in Miss Austen's novels, but we cannot help feeling certain that it was exactly what people of that class in those days would have said. When Anne Elliott, a young lady of the period, advises Captain Bennick, a young officer in the navy, who is given to quoting Byron, to go through a course of our best English moralists, she does so in perfect good faith, and without a suspicion of wrong. But how charming is the art that can make us accept this as the perfectly natural thing for her to have said on the occasion. The conversation between Henry Tilney and Catherine Morland, on the first night of their meeting in the Bath-ball-rooms, is another instance of the same kind, though not so striking perhaps at the first. There is, of course, always a difficulty in placing one's self entirely *en rapport* with any writer who describes the living manners of his or her own age, which is at a long distance from his own. Do what we can, we feel solitary in their company. When we read a writer of our own day who describes the manner of a hundred years ago, we feel that we have a companion in our enjoyment. That cannot be felt by any one who reads Miss Austen.

Her style deserves the highest commendation. It has all the form and finish of the eighteenth century, without being in the least degree stilted or unnatural. It has all the tone of good society without being in the least degree insipid. For a specimen of crisp, rich English, combining all the vigour of masculine with all the delicacy of feminine style, we suggest the opening chapter of "Northanger Abbey" as a model for any young lady writer of the present age.

T. E. KEBBEL.

CHAPTER VI.

CERTAINLY the new Fellow of St. Margaret's might consider that he had made the most of himself, so far. It was not only that he had succeeded, but his success had been entirely owing to his own exertion; and in such a case a little self-glorification is not unbecoming. Unlike most men, he was not forced to think how differently he would act were it in his power to begin his university life over again. He had not run into debt; he had formed no social habits that require an expenditure of time or money; he had not even wasted himself in conversation, intellectual speculation, or desultory reading. As he had been at school, such was he in his freshman's year, and such he remained until he put on his bachelor's hood. From the very first day of his taking possession of his attic in St. Margaret's College he devoted himself entirely to the orthodox work of the place, in his pursuit of which he never allowed himself to be disturbed by any kind of distraction whatever. Moreover, every day with him meant work — work conscious and actual; and his power of realizing the immediate end to be attained, and of adopting and carrying out the right means to attain it, was so strong that he can scarcely be said to have exercised any real self-denial in the course which he pursued. Spurred on by his special form of ambition, or rather by what stood in the place of ambition, he showed what may be done by a student without genius, without the incentive afforded by a sense of duty, and without enthusiasm, or love of learning for its own sake. Had the rewards of his university been bestowed for proficiency in billiards, to billiards he would have devoted himself with equal zeal; and it was in precisely the same spirit that he devoted himself to Greek and mathematics. As may well be supposed, he was not very popular among the men of his own standing, and made but few acquaintances; but he made himself respected, and he valued college popularity at its true worth — which is very little. While far abler men than himself were living according to the number of their years, this old head upon young shoulders was exemplifying the fable of the hare and the tortoise.

Not a remarkably amiable character this, but certainly not weak or contemptible. Such men do not often achieve greatness, but success they can scarcely help achieving. In the result, at the end of his three years, Warden was, on the whole, beaten by only two men in his year: in mathematics, by a man who, young as he was, loved science with the unselfish and all-absorbing love that she demands from her lovers; and in classics, by a strange sort of ruffian who was drunk five days in the week, who slept all the sixth, and who then on the seventh, when he was awake and sober, laughed over Aristophanes till he was drunk again, but who spouted Anacreon over his cups, and dreamed of Greek roots in iambric trimeters. But, barring the enthusiast and the genius, the practical man, who simply read hard to secure his fellowship, was in front of the field. And he had his reward; for while he sat in ease and comfort at the high table of St. Margaret's, the senior wrangler was dying of consumption; and the constitution of his other rival, originally as strong as that of a hundred horses, had begun to yield to the inevitable Nemesis of drink, after its possessor had come to grief with the authorities on account of some Greek epigrams which had displayed a great deal more wit and scholarship than reverence or decency.

And now Mark Warden, to whom Aristophanes was only so much matter to be "read" — to use the word in its undergraduate sense — to whom the stars might have been bits of tinfoil for anything he cared, and who, for reasons that Marie could have told, had no right to sit at the high table at all, returned to his father's house as it were in a halo of triumph. When he reached it, the street-door was standing open, so that he had no need to knock or ring in order to pass through the entrance-hall into a small parlour — how small it seemed to him now! — in which a suggestion of wall-flowers unnaturally strove with a decided perfume of tobacco and hot spirits. It was furnished in a more home-like style than the room in Market Street, and yet, somehow, it did not look so much like home. The effect of it upon Mark was even rather chilling. His college rooms were by no means extravagantly sumptuous or unnecessarily comfortable, but they had the advantage of the comparison; and then it must be remembered that he had been a little put out of temper with himself and his belongings towards the end of his journey. And then this was no longer really his home. He had risen above the family level, and its ways were no longer his ways, nor its thoughts his thoughts. And then the old scene suggested memories to him that three years of work and absence had naturally not a little clouded; and although they had been very bearable to him while they did not affect his daily life, they began to look formidable

now that he was in the very midst of them again.

The parlour was empty of all save the greasy leather chair, the scratched and bruised mahogany table, the worn-out carpet, the dusty corner-cupboard, and all the other articles of furniture that he had once accepted as part of the nature of things but which now looked to him so wretchedly mean and shabby. He was about to pull the bell-rope to announce his arrival, when a maid-servant, not over neat or clean, considering the lateness of the hour, and who, to judge from the redness of her bared arms, in which she supported a tray, might have been own sister to her of Market Street, as indeed very likely she was, put her head in at the door, and then, overcome by either fear or modesty at the sight of a strange gentleman, gave a scream and let the tray with its contents — fortunately not fragile — clatter upon the floor.

"Is my father at home?" asked Mark, a little crossly, for such a welcome as this jarred upon his nerves.

"Why, save us! it's Master Mark. Lord, sir, how you be growed out of sight! You give one quite a turn."

"I was expected, was I not?"

"Well, Master M——, sir, I did hear something. But master, he've dined ——"

"Oh, I didn't mean that. Is he in? or my sister?"

"Master's in the surg'ry. And Miss Lorry — I'll go and fetch her."

And this was the triumphant return!

Presently, however, down ran Miss Lorry — beaming, gushing, rosy, and untidy. "Oh, Mark," she cried, throwing herself upon him with a rush, "we'd quite given you up! How hungry you must be!" — was it his fancy only that she said *'ungry?* — "But I'm *so* glad! Did you come all the way from Cambridge to-day?" — This was not likely, seeing that the journey was over two hundred miles. — "Only think! why, I shouldn't have known you! I *am* so glad!" And, to do her justice, she looked as pleased as she said she was.

"It is a long time, isn't it? and my father?"

"Oh, he's all right; Jane is gone to tell him. He'll be here directly. Oh, I *am* so sorry! We had dinner at one. I wonder is there anything in the house! Oh, of course — there's the mutton; I daresay it's got cold by now. Or it might be warmed, mightn't it? Oh, here's papa. I thought he wouldn't be long."

And so in came Mr. Warden from the surgery — tall, big, loose, florid, loud-mannered and loud-voiced as ever, or rather more than ever, bringing with him a jovial smile, and an atmosphere that showed that if Lorry had been answerable for the scent of the wall-flowers, he was responsible for the other part of the odour of the room.

"Ah, Mark, my boy — delighted to see you! So here you are back again with three hundred a-year all of your own! Who'd have thought it? Ah, college is a fine thing. Fancy a boy of mine making money! Ha, ha, ha!"

"I've had to work for it, though."

"Well, well; that's all the better, isn't it? Everybody ought to put his shoulder to the wheel — that's my maxim. But all work and no play, you know. So now you've come to idle a bit, hey?"

"And how are things with you, father?"

"Oh, slack — slack. But we rub on, Lorry and me. One might do something, if it weren't for that damned fool Jones. I was in consultation with him to-day. He's got in with madam, you know — and much good he'll do her. 'Pon my honour, I don't believe he knows the liver from the stomach; and as for his *diagnosis* — pooh!"

By this time the mutton made its appearance upon the same unfortunate tray. It was both red and tepid; but hunger, though used to look for its satisfaction to the high table of St. Margaret's, is still hunger, and Mark had not grown too dainty to be superior to the effects of a long day spent on the roof of a coach. Besides, the air of Denethorp is not much less appetizing than that of Cambridge itself, which is notorious in that respect. And so, though his eyes revolted, he attacked the joint not unwillingly.

"You mentioned Miss Clare," he said, after a few minutes of silence, during which Lorry sat staring at him with all her eyes, and his father ruminated over the sins of Jones. "I travelled with her nephew from Redchester."

"Ah, young Lester? Not a bad fellow that. Set a collar-bone for him once, out with the hounds, when he wasn't that high. He's tall enough now. Lucky dog he is. By the way, there's to be a fight."

"A fight?"

"Yes, for Johnstone's seat; and he'll be beat too. You're just in time to see the fun."

"And who's going to stand, then?" Politics had not been in Mark's line, and so he only asked the question for the sake of saying something.

"Oh, a man named Prescot — another lucky dog, and an out-an-outer — reformer, you know, and that. Speaks just like a what's-his-name, and in with all the mill

people. He canvassed me the other day. I'd half a mind to promise for him, just to go against that ass Jones."

"But you couldn't do that very well."

"Couldn't I, though? And I would have too, only then there's that other young ass Smith, who's got hold of that lot. What they can see in him Lord knows. Why, he isn't as old as you are. Jones don't know a liver from a stomach, but Smith don't know man from mutton. No, no. I must vote for Church and King — Church and King, you know — if it was only to put down young Smith. 'Confound their politics, frustrate their knavish tricks!' Now, Lorry, just get out the tumblers, there's a girl, and the brandy. I'm going to have a pipe."

His son did not smoke, nor did he drink spirits, whatever taste he, as a college fellow, had managed to acquire for the nobler port. So he sat unoccupied while his father filled the long clay pipe, of the kind known to connoisseurs as a "churchwarden," and mixed himself a pretty stiff tumbler.

"And now we're comfortable and all at home again," said the latter. "Why, bless my soul, Lorry, you have'nt had that window mended yet! We don't want that sort of draught — ha, ha, ha! And now, Mark, my boy, what's next?"

"Next?"

"Yes — when you're going in to be a bishop, you know?"

"I'm not at all sure I shall go into the Church at all."

"What is it to be, then?"

"I think I shall go to London and read for the bar. I've got my fellowship to keep me meanwhile, you know."

"Read for the bar! Bless my heart and soul!" Let it be remembered that to be a barrister was in itself something of a distinction in those days, whatever it may be in these.

"Why not? It seems my best way of doing something in the world."

"Well, you know best, no doubt — you know best. Only be anything but a doctor, that's all I say."

"La, Mark," said Lorry; "what, like the people when the judge comes in at Redchester? And shall you have to wear a wig?"

Any reply that her brother might have been going to make to these appreciative remarks was interrupted by the arrival of one of the friends of the house — a managing clerk to one of the Denethorp attorneys, who, like his master in the old times, occasionally used to drop in of an evening to smoke a pipe with the Doctor. He was rather a smart fellow in his way, and was publicly supposed to have half an eye upon Miss Lorry — perhaps he would have bestowed the other half also upon her had her fortune been equal to her merit.

"Ah, Brown," said Mr. Warden, "sit down, my boy. Mr. Brown — my son from Cambridge." The two bowed to each other — Mr. Brown genially, Mark stiffly. "And how are things going, Brown?" continued the Doctor. "What's the news?"

Mr. Brown was certainly not "good style," and Mark had of late grown marvellously particular about such things. Besides, he had but just parted from Lester, whose style was undeniable. And so he did not go through his part of the introduction with a very good grace.

"Miss Warden," said the other, "delighted to see you so blooming. Sir, delighted to make your acquaintance — proud indeed. Johnstone's retired."

"What?" said the Doctor; "madam going to throw up the sponge? You astonish me!"

"Sounds queer, Doctor, don't it? But you don't know elections like I do. Between ourselves, you know, it'll turn out a dodge."

"To put Prescot's people off the scent?"

"May be. But any way it'll be a dodge. Catch madam asleep — catch a weasel! Not to speak of White & Son. And I will say that for them, that no one ever caught the office napping yet. And there's something up — that I know for certain. You know young Lester?"

"Of course."

"Well, between ourselves, you know, it's a fact he came down by coach this very day. What do you think of that? Put two and two together — eh? I heard it from Sparks, who sat behind him all the way from Redchester."

"And what's he to do?"

"Why, stand! that's what he's to do. You take my word for it, madam means fighting; and I will say that for her, that when she means fighting she fights — and no mistake. But won't the money have to fly, that's all!"

"I wish some of it would fly my way," said the Doctor, meditatively.

"It'll fly every way!" said Mr. Brown, triumphantly. "Denethorp hasn't had such a chance this many a day!"

CHAPTER VII.

It must have become pretty evident by this time that Mark Warden was sailing under false colours — that he had set out on the voyage of life in rather buccaneer fash-

ion. He could not but own it, even to himself, distinctly and consciously.

And yet — what was he to do? Everything had somehow or other seemed so plain and easy to him while he was at Cambridge. There, he had not been able, living as an unmarried man with other unmarried men, absorbed in the work of the place, with only himself to think of, to feel that he was not as others were. Marie had become a sort of dream to him; and so he felt, whenever he thought about the matter at all, that he must have become a sort of dream to Marie. Had he been an idle man, with nothing to do but write love-letters, things might have worn a different aspect to him. But when a strong man's heart is in his work, and when that work is purely selfish, he is seldom able to realize what concerns others. But now, once more in Denethorp, relieved from the iron of hard work, and in the midst of all the associations of three years ago, the image of Marie took a far more substantial form, and became anything but a dream. Once more, what was he to do?

He might resign his fellowship, declare his marriage, and take a curacy and pupils. "Of course," the reader will say; "what else?" But then he would have thrown away the hopes, the labour, the success of years; he would condemn himself to an obscure and uncongenial life for the rest of his days; it would be far worse than committing suicide. No — anything but that, he thought. And let not the reader be too sure, if he is not guided by some nobler principle than Mark Warden, that he, under similar circumstances, would not think in a similar way. And so, before he slept, he entered into a sort of compromise with himself. The marriage had been secret for three years — let it be secret for four; and then — who knows what might happen? It is not only weak-minded men, who, when pushed into a moral difficulty, cast their burden upon the shoulders of Fortune.

Nevertheless it was in a frame of mind made up of doubt and of that sort of self-justification which is the surest symptom of unconscious shame that he, on rising, faced the fresh, honest breath of the morning, laden with the old-fashioned fragrance of the old-fashioned flowers of long ago. From the window of his room he saw his sister, with uncovered head, sleeves tucked up, and shoes down at heel, mysteriously engaged with a clothes-line which extended from one brick wall of the garden to the other; and the sight did not please him, for it suggested to him the vision of a future Mrs. Brown. Then he descended into the parlour, still strongly flavoured with the effects of last evening. It was by no means early, but there were no signs of breakfast; indeed in that house nothing seemed to be done at any particular time or in any particular manner. Presently, however, his father came in; and then, somehow or other, breakfast and Lorry made their appearance together.

"Well, Mark," said the Doctor, "what are you up to to-day? I wanted to have seen something of you; but there's always something or another. I really must go and see that child of Wilkins's. I ought to have gone yesterday — only something put it out of my head; and — hang it! my boots weren't cleaned this morning. But never mind — they'll do for once in a way. But that reminds me — I promised to go and see what's-his-name on Sunday. Well, well, I daresay it was nothing particular."

"Oh, never mind me. I shall just stroll about somewhere."

Laura looked knowingly at her brother; for though not a *confidante* of his great secret, she had not been blind to his great flirtation. "I think I can fancy where you'll stroll to," she said.

"And, Lorry," continued the Doctor, "if Summers calls about that bill again, you know, tell him I haven't forgotten it, or something like that; and if anybody else calls, say I shall be sure to be in some time or other. And you can have that window mended — only don't pay for it; and have in another bottle of brandy from the Chequers — I've got an account against them there of some sort or another, so it'll be all right. And now I must be off." And so he marched away heavily, munching his last mouthful of breakfast as he left the door.

Then Lorry in a few minutes was carried off by the red-armed maid, and Mark was left to follow his own devices.

His sister had proved to be a true prophetess. As, indeed, he was only bound in duty to do, he took himself slowly and uncomfortably to Market Street. The distance was not far, but he was a long time in traversing it; for now that his meeting with Marie was imminent and inevitable, his anxiety about it, and about the nature of the relation that must somehow or other be established between him and her, for the present almost tempted him to fly from the situation altogether. He almost began to doubt whether he, the precociously wise, had not been guilty of a great piece of folly for once in his life.

Chance also aided his feeble attempts to procrastinate — attempts of which, to do him justice, he was half ashamed. It was by no means a pleasant thing for him to feel

that he, Mark Warden, Wrangler, Fellow, *et cætera, et cætera*, was afraid to meet Marie, who was Marie and nothing more. He would have sufficiently despised any other man who feared to meet a woman, and that woman his own wife. But for himself, he welcomed the chance that aided him, nevertheless.

At a smart trot along the High Street came a light trap, driven by his travelling companion of yesterday. Hugh Lester also saw Warden and pulled up.

"You're the very man I want to see, Warden!" he said. "What do you think? I'm going to stand for Denethorp."

"Indeed? But I heard something about it last night. I wish you a triumphant return, with all my heart."

"Thanks, old fellow. But you must do something more than that. You've become a great man here, you know."

"I am sure I did not know it."

"I don't know what people don't think you've been doing. There seems a sort of impression that you've been made Archbishop of Canterbury. I've been having a little talk with White, you know. I wish you'd come and see him, if you wouldn't mind."

"But what could I do?"

"Oh, lots of things. You see this is how things are, or something like it. You have heard, I suppose, that they want to turn us out?"

"But they won't, of course."

"Not if we can help it. But from what White says they seem to have got all the brains on their side and most of the money. Are you a good hand at talking — at spouting, I mean?"

"I never made a speech in my life."

"Never mind that. The fact is, White has been asking me about you, and I told him you could do everything. So just come and see him, there's a good fellow. I shall be tremendously obliged."

"I shall be delighted to be of any use, of course — if I thought I could be of any."

"Of course you can. You'll come and see White, then?"

"Now?"

"If you could. Can you?"

Warden smiled to himself. This was indeed a triumph in its way. So he was to be pitted against the new comer — to provide brains for his party! It was *faute de mieux*, of course; but a man, when he feels really flattered, does not think of that. He had had a welcome back worth having, after all. "It is always so," he thought to himself; "a man is always best appreciated outside his own home."

But then Marie — he ought not to be an hour longer in the place without at least trying to see her.

"I have a call to make," he said; "but that will keep, if you and White really want me."

"Jump up, then — I'll drive you, and we can talk as we go along. By the way, I have to go a little out of my way first — you won't mind? I have to pick up a young lady who is staying with us, and who came in to make a visit, and whom I'm to drive back to Earl's Dene. You know something of her, perhaps? — Miss Raymond of New Court, you know."

"Indeed? My father used to know Mrs. Raymond."

"No doubt; she's a capital girl. I mean her to canvass for me furiously; and as you're to do the same, I must introduce you. I wish I had an elder brother, Warden — catching votes won't be such good fun as catching trout, I fancy. However, I'm in for it now — so Lester for ever!" he said, with a laugh, and a touch to the horses that made them start off sharply. "I shall be as excited about it as my good aunt herself before it's all over. Gently, Bay — that child may be a voter's — so there's my first piece of bribery," he said, as he threw a coin to a small child that had apparently taken care to wait before crossing the street until its passage lay directly under the horses' heels. "And now, here we are."

They had turned into Market Street, and to Mark's surprise, had stopped at the very bootmaker's shop to which he himself had been bound when he was overtaken by Lester. Surely it was not likely that Miss Raymond of New Court should buy her shoes in Denethorp, much less in Market Street. He devoutly hoped that none of the Lefort family might be looking out of the window, for he naturally wished to make his own visit in his own way.

Lester sent his groom with a message for Miss Raymond that he was at the door; and presently down came Ernest to say that she would be ready immediately.

Now Ernest was rather a sharp child, and something of a terrible one also, as sharp boys of his age are apt to be; nor had Cambridge turned Mark quite so much into a silk purse as to have rendered him unrecognizable. And so the messenger, without having delivered his message, and without any awe of Hugh, made a charge at the side of the trap at which his old acquaintance was sitting.

"Why, Ernest!" said the latter, with forced geniality, "where do you drop from? and how are they all?"

"Oh, all right. Oh, I was to say the lady will be down directly."

"And who are you, my man?" asked Lester.

"Oh, I'm Ernest."

"And who's Ernest?"

"Don't you know? Ernest Lefort."

"You know the Leforts, Warden?"

"Yes — that is — oh yes, I know them. Wait a minute, Ernest. I'll just run up for a second, Lester, if you don't mind."

"All right. By the way, would they mind my going up too? It would be rather a joke — I'll tell you why afterwards. I know one of them myself."

Now it would be doing Mark Warden supreme injustice to suppose for a moment that he was in the least really ashamed of his humble friends in the presence of his grand acquaintance. His real desire to make his visit alone was of course founded on other reasons. But still to guide the heir of Earl's Dene to the bootmaker's second floor was rather a downfall, after having been paraded in the streets of Denethorp as his familiar companion, and he felt it a little.

Monsieur Lefort had gone out to give his lessons, so that when the two entered, preceded by Ernest, they found only the three girls and Fleurette, who was amusing herself upon Miss Raymond's knee.

The circumstances were not favourable to a lover-like meeting between the husband and wife; and now that matters had so turned out, Mark was not altogether sorry that he and Marie were forced to meet as though they had been nothing more to each other than old acquaintance. But he read in her eyes, and in the warm rush of light and colour to her face when she saw him, that she, however, much she had changed — and changed for the better — in person during these three years, was unchanged as far as he was concerned; that her heart was still as much his as if the three years had been but three hours. And for this too, so mingled were his feelings, he could not find it in his own heart to be sorry. Who can be really disappointed or displeased at finding that a woman has remained more true to him than he has remained to her? For an instant she was once more to him the Marie of old times, and he fully answered the speech of her eyes with his own.

On their entrance Miss Raymond rose and put down Fleurette. The business of introduction seemed likely to be complicated, for there was no one in the room who was acquainted with everybody in it, and except Hugh, everybody was surprised to see everybody else.

"Miss Lefort," said Hugh, to cut the matter short, I am exceedingly sorry to break up so pleasant a party; but as my friend Warden would have done so in any case, I yielded to the temptation. Miss Raymond, this is Mr. Warden of St. Margaret's, who is going to help us in our battles."

She looked at Warden with her honest eyes, and made him a cold and formal curtsy, which, had he observed it, and had he been given to speculate about such things, would have puzzled Hugh considerably. Then, turning to Marie, and seeing her embarrassment at the unexpected visit,—

"Now, Miss Lefort, I really must go. Angélique, this is Mr. Lester, Miss Clare's nephew."

Now Angélique, in spite of Miss Raymond's kindness to her, always made a point of remembering and keeping what she considered her place as a dependant; and so for these few minutes she had retired into the background. Now, however, she emerged from her dark corner, and Lester saw her — suddenly.

The ascent into that poor and shabby lodging had been worth making, with a vengeance! Hugh felt as a traveller in the desert would feel who should all of a sudden light upon a rose-bush in full blossom springing from the dry stones. By the side of Alice Raymond she was like a southern night beside a pale northern morning; by that of Marie, like the full moon with its faint attendant star. He was certainly no poet, nor did conscious images enter his mind; but somehow the chairs and sofas did idealize themselves almost as absurdly as if he too had thought of Arabia Petræa in connection with them. Not that the comparison is so very absurd either, for they were certainly hard enough.

Angélique must have been exceedingly stupid indeed if she had been blind to the effect that she produced upon the prince of her cousin's fairy tale, and miraculously free from vanity had she not been gratified by it. Truly if it is the early bird that picks up the worm, it is not necessarily for its own eating.

No one else, however, noticed anything. Miss Raymond was busy with her shawl, Marie with Miss Raymond, and Mark, as usual, with himself — perhaps also a little with Marie. Still Hugh fancied, after a moment, that he must have betrayed himself, although, in fact, he only appeared to be a little awkward, as men for the most part are under any circumstances when they have just undergone the misery of a sudden introduction.

Lester. — "Are you living in — in

Denethorp, Miss Lef—— Mademoiselle ?" ("Damn it! what an ass she must think me!")

Angélique, not showing that she thought so at all events, and in her sweetest voice.— "I am only on a visit. Miss Raymond was kind enough to let me come here while she is at Earl's Dene. This is my home, however — at least when I am not with her."

Lester. — "Oh yes — I forgot; Miss Lefort is your sister?"

Angélique. — "My cousin."

Lester. — "I suppose you heard of our interview this morning?"

Angélique. — "Oh, she gave us quite a grand account of it."

Lester, recovering himself a little. — "And abused me, no doubt?"

Angélique. — "On the contrary, I can assure you."

Marie.— "Oh, Mr. Lester, what must you think of me! I have not thanked you and Miss Clare ——"

Lester. — "You will do so by coming. And" (to Angélique, or, more accurately, at her) "you also — if — that is ——"

Angélique. — "I am no artist, I am ashamed to say."

Miss Raymond. — "Don't believe her, Hugh. She does everything."

Angélique, to herself. — "I wonder why she calls him Hugh? But I should have known if there was anything." Aloud — "Badly, Miss Raymond was going to add."

Miss Raymond. — "Indeed I was not, though. If Mr. Lester were not in a hurry to get away, I would punish you by condemning you to the harpsichord on the spot."

Angélique. — "Oh, pray, Miss Raymond ——"

Lester, forgetting all about Warden, White, and everything that he ought to have remembered. — "Would you? Might I ask?"

Angélique, throwing him a look of private and special complaisance. — "I would much rather you would excuse me, indeed. I am really not ——"

Lester. — "But I am sure that — will you try?"

Angélique, with a look of the same kind as before, but tempered by a half-smile. — "But perhaps you do not care about music?"

Lester. — "But I do indeed. There is nothing that I care for so much."

Miss Raymond, opening the harpsichord. — "Oh, Hugh, that's just what you said last night about hunting! There, Angélique — you see you will have to do it."

Angélique. — "I wish you had not raised Mr. Lester's expectations. However, I will do what I can to dissipate them. Ah, you have no doubt heard Miss Raymond herself?"

Miss Raymond, laughing. — "If he had, do you think I should give him the chance of hearing you? I am not quite so careless of my reputation."

And so Angélique, having displayed the proper amount of unwillingness, sat down and sang.

What she chose to sing is of no consequence, nor how she sang it. Lester knew nothing about music. Englishmen in those days knew as little about it as they do now, and cared about it even less. But nevertheless he was soon lost in a heaven in which he forgot every man in the world and every woman but one — in which he became so lost indeed as to forget even his horses, which were impatiently pawing the stones before the door.

CHAPTER VIII.

At last, however, when the one song had grown into many, the visit came to an end. Lester had, when in his ignorance of what was to come and on the spur of the moment he proposed to amuse himself by following up his adventure of the morning, intended that it should last about two minutes; and to him, indeed, it seemed to have lasted not a second longer. In truth, however, the church clock, unheard by him, had twice chimed the hour. Miss Raymond had been in no hurry to run away, for she enjoyed the slightly Bohemian character of the whole thing, and was easily amused; and Mark, though he was not enjoying himself at all, could not under the circumstances betray his desire to cut the visit short.

When the three visitors departed, Lester carrying away with him a look, sharp as a sword but soft as velvet, thrown to him from the dark eyes of Angélique, which had the effect of filling his whole heart and of raising his spirits to a delightful point of mild fever, then said that young lady herself to her cousin, —

"*Eh bien, chère enfant!* I congratulate you on that worm of yours!"

"What — Mr. Lester?"

"Who but Mr. Lester, of course? He is really a very good-looking boy. And so that is the heir of Earl's Dene?"

"I really do not know. He is Miss Clare's nephew. Yes, I suppose he is."

"And has she any other nephews, or any people of that sort?"

"I believe not."

"And what do you think of my Miss Alice!"

"Of Miss Raymond? Oh, she is quite charming, and so kind!"

"Yes, she is no doubt. Suppose there should be a match between them?"

"I am sure they would suit each other admirably."

"My dear Marie, what a child you are!"

"Why?"

"Why? because you are. And now, what has your old friend Mark Warden had to say for himself? Why, how you colour!"

"Do I? I'm sure I didn't know it. I am very glad he is back again."

"He has certainly improved — he looks like a man; much more of a man than young Lester. He was a very disagreeable boy, though."

"Angélique!"

"Now, dearest, please don't scold me, or look at me through your eyebrows like that. I have no doubt he is perfection now. Do you know, I feel quite in high spirits. Do you think of going to Earl's Dene to-morrow morning?"

"To-morrow? I don't know. Perhaps one had better not to-morrow. I wish Mr. Lester had not made such a point of my going."

"Oh, Marie, what an old prude you are!"

"I think it might be better not, perhaps. It was altogether rather a fuss about nothing?"

"Very likely, dear. But then one thing comes of another; and nothing doesn't come from nothing always. Now I am sure we have had a very pleasant morning party, and that would never have been but for your going to the park. And then it would seem so ungrateful of you not to go now."

"I hope not. I can't help thinking that the whole thing has gone far enough. As you say, we have had a very pleasant morning party ——"

"Well?"

"And let that be the end of it."

"Why, do you take Mr. Lester for a wolf, and us for two innocent lambs? I am not a lamb, I assure you, and I don't mean to be; and he seems to me to be very harmless. And Miss Raymond here too!"

"I daresay you are right. But still —— Come, now we are alone, tell me something about Félix."

"There — you may read it if you like."

"What — all?"

"Why not? There are no secrets."

And so Marie took the letter, and read as follows, while Angélique returned to her favourite window, and amused herself with the first two cantos of "Don Juan," which she had brought down with her:—

London, ——th

"Dearest,— I am in England — in your land! In mine too, for since you left Paris, France has been my land of exile — England my true home. Are you surprised? But you cannot be surprised that my body should have followed my soul. Do not be surprised if it follows you more closely still, for your absence has cheated me of the reward of seeing you. Shall you be long gone? When shall you be back? If Paris became a desert to me when you left it, what must this London be? I am angry with the sun for shining where my own sun is not; I can only hope that it is the herald of your return. Is it so?

"The first thing I did on arriving, before doing or thinking about anything, was to call in the Square of Portman. What a gloomy house! That also seemed to feel its desolation. There, after much difficulty — for the words 'I love you' help me not much, and of your tongue I know no more — I learned where you now are, and that you are so many leagues away. Then I carried a letter of introduction to a friend of M. Prosper, who, as you know, has friends everywhere. I found him at the theatre, where he is director of the music. He received me well, and thinks I did not wrong to come here as an artist. There is room enough for foreign musicians, he tells me, since the peace, and he will be able to get me an engagement either at his own house or at some other before my purse is empty. You will say, perhaps, this does not sound very grand. But what would you? Rome was not built in a day, and I am not afraid were London ten times as large. Do I not love you? and is not that enough to become great — is it not more than enough?

"I have so much to say to you, or rather I want to hear you say so much to me! For indeed I have but little to say but that I love you more than ever, were that possible; but love makes me afraid, makes me doubt, though I know your truth so well: I want to hear once more from your own lips that you have not changed since the time when Paris was not a desert to me."

"Am I to go on?" asked Marie.

"If you are not *ennuyée*," answered her cousin, calmly.

"I tremble so much when I think what kind of life is yours — not solitary like mine.

If I knew not your soul so well I should often despair, even now, when I think how much you are above me. For that alone I *will* become great, and that soon. And music to me is so entirely filled with you that how can I help being inspired!

"Of course as yet I know no one here, nor do I care to know anybody or see anybody but one, and she is invisible. Pray send me a line to say when I may hope for my winter to be over, and for my summer to come. If it is long first — but do not let it be long!

"Longing for you, for anything from you, dearest Angélique, your wholly devoted

"Felix."

"Is it not nonsense?" asked Angélique, as she took back the letter.

But Marie did not think it nonsense by any means, and she answered by an embrace.

"Poor fellow!" Angélique continued. "Yes, he is very good, but then he sometimes is very tiresome."

Marie stared.

It did not, however, strike Angélique herself that she had said anything very surprising, so she did not observe the effect of her speech. "You see," she went on, "he is very amiable and very clever, at least as a musician, and I like him very much — better than any one I know, except you — and when I come out he would do admirably for a husband, if I am to fall into that line; and he is quite good-looking enough, and he is a gentleman, although he is only a fiddler——"

"Angélique!" This seemed to be Marie's limit of reproach.

"Marie!" replied Angélique, imitating her tone. "You don't expect me to find perfection, do you? And, after all, if it comes to that, I don't consider myself hopelessly engaged."

"Not engaged?"

"Of course we are after a fashion. But then there are so many ways——"

"My *dear* Angélique!"

"Oh, you need not be afraid; I do not mean to break his heart. I shall marry him, no doubt, if he ever makes enough to keep us both from starving. You would not have me be a clog upon him, would you? And if it is not to be, why, it won't be, that's all."

It will be gathered from this conversation that Angélique was the elder of the two, not only in years, but in some other things besides. But then she had seen a great deal more of the world.

"Oh, Marie," she said, "I do wish I were a man!"

"Why?"

"Because I could marry you."

But Marie did not smile. She said, crossly for her, though not for any one else, "I know you do not mean a single word you have been saying."

"Of course not — who ever does? But I really should like to have you for my wife, Marie. But men are such simpletons. Come — don't let us quarrel any more. I feel inclined for a walk."

And so for a walk they prepared themselves — Angélique in the very best of spirits, Marie rather sadly. At all events her cousin had puzzled her considerably.

Nor is it certain that such sadness as she felt arose wholly from what seemed to her her cousin's unnatural way of speaking of her lover. That, she simply did not understand; and although it jarred upon her, she never dreamed that somehow it was not all right in reality. It was that, without knowing it, she had been disappointed in Mark Warden — if, indeed, "disappointed" is not too strong a word.

Not that she realized any such feeling. On the contrary, she was proud of his success, proud of his apparent friendship with Lester; for the people of Earl's Dene were the aristocracy, almost the royalty, of her limited world, and, paradoxical as it may sound, it is just those who know least of the world who are most impressed by rank and wealth. She was proud, also, of his improved appearance and bearing, and she was proud that her old belief in him had been justified. But behind all this not unreasonable pride there lurked a feeling of the existence of a want or loss of sympathy — that most intangible and indescribable of feelings which is always most strong when it is most intangible and indescribable. It was not that he had seemed cold and undemonstrative. He was cold and undemonstrative by nature, and perhaps in this lay no small part of his influence over her; for reserve, inasmuch as it implies strength, is the great secret by which anything like real influence over a woman is both gained and secured. Besides, there had as yet been no opportunity for any display of warmth, seeing that the two had met not only before others, but before strangers. But still she had found his manner towards her not such as it might have been in the presence of a hundred strangers, although she could not have specified a single instance in which he could have spoken or acted differently. The fact is, that he could not under any circumstances have spoken or acted differently; and had he been in reality altogether un-

changed, no want or loss would have suggested itself. But as the want did exist, it would have equally made itself felt in any case.

It is really impossible to put in words, which are always, even at best, terribly gross and hard, the faint suggestion of another unconscious feeling that found its way into the heart of Marie; for while words are strong in proportion to their direct strength and plainness, feelings are strong in proportion to their obscurity. To attempt to express their shadowy *nuances*, even in poetry, is to risk trespassing on the province of another art; for though Art, in a very high sense, is doubtless one and indivisible, still, practically, its branches have very fixed and definite limits, which ought to be, and indeed to some extent must be, observed. Now, unfortunately, that form of art which works with words, while it is not less noble than other forms, and while it can, in many respects, soar far higher than the others, is in this respect the most limited of all. It cannot affect the heart but through the logic of the mind — a terrible drawback when it is necessary that the heart should speak to the heart without the intervention of any logical process or logical symbols. Musicians and painters are far better off in this matter; they may reach the soul through the senses alone. The eye and the ear have no need of reason in order to understand; they need but to see and hear. But what can a word do, after all, with its fixed and inflexible definiteness, speaking to no sense, and only suggesting in the first instance a cold, gross sort of accuracy, which is absolutely hostile to the expression of emotion?

The application of all this is, that were one to say that the perusal of her cousin's letter produced a sensation of jealousy in the heart of Marie, a word would be employed that would be as inappropriate as possible; and yet, at the same time, any other known word would be more inappropriate still. Jealousy is a feeling of which, accurately speaking, she was utterly incapable; and had she been capable of it, it would never have been where Angélique, her heroine of heroines, was concerned. But is it just possible to conceive of a sort of jealousy — there is no help for it, the word must be used — which conveys no suggestion or taint of anything hateful or degrading, even although its cause is fanciful and even absurd? In the infinite series of emotions there must be some such feeling, though the note that represents it may have no place in any recognized scale. Indeed some such thing must exist, for Marie experienced it. The letter had supplied her with a material foundation upon which to fix her floating half-thoughts about her husband. She was able to make an unconscious contrast. And yet, somehow or other, he gained something by the contrast too. And so, for the first time in her life, her heart was really troubled, and she did not know why.

But it was, in truth, all plain enough. She, like her husband, had not exactly been standing still all these years.

CHAPTER IX.

But Angélique, though excited, was certainly not troubled in any disagreeable sense. Not that her thoughts and dreams were always of the most agreeable kind; for, thanks to her friends the Raymonds, she had seen something of the world, and was very naturally dissatisfied with her position in it. She could not avoid holding the doctrine that things in general were not quite as they ought to be. No one likes to own that he or she does not belong, by right of nature, to an aristocracy of some kind or other, and every one believes that his or her own kind is the best and truest. Miss Clare would not have agreed with her; but there is something, at least, to be said in favour of the idea favoured by Mademoiselle Angélique, that beauty and talent are not in their right places when they serve only to attract penniless fiddlers, and to waste themselves upon one who, being, socially speaking, nobody, was unable to outshine by their means the plainest and stupidest of the class to which Miss Clare and Miss Raymond belonged. She could not admire a condition of things in which the maid had to outshine the mistress in vain; in which the New Courts and other good things of life belonged to the less clever; and in which Fortune, unlike the shepherd of Ida, threw the golden fruit to the less beautiful.

She was quite sufficiently quick to judge of the motives of the people about her; and she did not suppose that Miss Raymond had been invited to be a guest at Earl's Dene for nothing. Indeed, had she herself not been given to draw conclusions from what she saw, the never-ceasing gossip of the town, always busy with the affairs of everybody, would have drawn them for her. Miss Clare had not entertained a visitor, save on matters of business, for years; and now, just when her heir had come of age, and was at home, she was entertaining one who was young, beautiful, and rich. Within the last few hours Earl's Dene and New

Court had been married many time over by many tongues. A great many things passed through the brain of Angélique while Hugh Lester was standing over her at the harpsichord, and set her wits wandering in the country of infinite possibilities — a process with which coquetry had in reality but very little to do. Marie would have stared, indeed, had she been able to read the last thought that passed through her cousin's mind before she fell asleep, for it was nothing short of this: —

"And suppose . . . . and suppose that I were Mrs. Lester of Earl's Dene . . . . Lady Lester of Earl's Dene . . . . Angélique, Countess of Denethorp . . . . "

And where she would have arrived in her dreams heaven knows, were it not that waking thoughts and dreams seldom have much in common. Perhaps she experienced in them the fate of Alnaschar; perhaps they were with Félix.

But enough for the present of girls and their dreams and fancies. The war between Whigs and Tories, between Earl's Dene and the cloth-mills, had begun. Before, however, entering upon a subject of such importance, yet one word more must be bestowed upon Angélique, for her letter from Félix required an answer. In the following copy of it, the words placed in brackets appeared only in the rough draft, and were in her fair copy altered to those that immediately follow them. It will be seen that there are not many such alterations; for she was an excellent secretary, as well for herself as for Miss Raymond: —

"23 Market Street, Denethorp, — *th*.

"My dear Felix, — I own I *was* surprised to learn from your letter that you were [so near me] in London. Is it quite prudent of you to have taken such a sudden step? But I suppose you considered it well, and acted under good advice. It would be most painful to me to think you had acted [thus on my account] otherwise. Did you consult M. Prosper first? If you did, you have not told me what he said. I am very much afraid [as you say it will be a disappointment to you] that I shall not be able to return to town immediately, or even soon. Miss Raymond has not yet said anything about coming back, and of course my movements depend entirely upon hers. She has been good enough to do without me while she is here, and I am staying with my uncle and cousins [and am enjoying my visit to them very much]. Of course I shall be glad to see you. But do not think of coming to see me here; it would never do. This I mean *really*. You must stay in London and work for *your own* sake, and show a little patience for *mine*. I should be very [angry] vexed, indeed, if you were to come here; and so you will not, I am sure. Indeed I do not see how you could, as you are looking for an engagement; and you *ought* to get one as soon as you can, and not lose your chances for a mere *caprice*. If you have made a useful friend in this person to whom M. Prosper has introduced you, you must not lose him, if you really mean to be as successful as I am sure you may be if you like. — With all best wishes, believe me your affectionate friend,

"Angelique Lefort."

Never was colder letter kissed. But then wisdom always seems cold, and Angélique was rapidly growing wise. It is one thing for a young girl, with her character scarcely formed, to indulge her first fancies by falling in love, or by imagining that she falls in love, with a kind of romance hero, especially if she had been touched by the *mania Byronica*; but it is a very different thing for the same girl, when months of youth, which correspond to years of later life, have defined her feelings and made her capable of forming something like a real purpose, to keep faithful to mere romance. It is not at all wonderful that, in the day of the Medoras, the Gulnares, and their tribe, a very little mystery should have been able to go a long way in attracting her fancy. Even now, when Laras and Conrads are gone out of fashion, mystery is notoriously by no means a bad line for a man to take if he wishes to be thought of with interest by a very young girl whose dreaming days are not yet over. When, therefore, Mademoiselle Angélique was really young, the young artist, who chose to wear his hair long, who talked in the language of romance, and yet of sincerity, about love, art, and so forth; who came from a land of hills and forests, and who, for anything that he knew about his birth and parentage, might have been the heir of the Bourbons themselves; who preferred as a matter of taste, to make love to her secretly, and who shared in that absurd but not unamiable kind of hypocrisy which leads very young men to like to make themselves out to be very much worse morally than they really are, — had quite enough points in his favour to touch her fancy if not her heart. She would have preferred, no doubt, that they had been respectively sultana and pirate, instead of only being *dame de compagnie* and fiddler, but still imagination will do a great deal to

such cases — a great deal more than change a fiddler into a pirate and a *dame de compagnie* into a sultana of sultanas. The unromantic Marie would have been safe, in all probability, from the influence of a real and genuine Lara; but the violinist was unconventional enough in his ways, singular enough in his appearance, and mysterious enough in his origin, to pass in her cousin's eyes for a sufficiently good imitation of the real thing — as a peg on which she might hang up her fancies to dry. For she had thought a great deal about love in those days — as much as she was getting to think about marriage now.

There are one or two proverbs that contain more truth than falsehood; and one of them, unhappily, is, that familiarity breeds contempt. Though mystery is a good key, it is a very bad lock; it does very well to open the door of a heart, but it is by no means well adapted to keep it safe and secure. This must be done by sheer strength; and of sheer strength, overmuch talk about love and art, and the youthful affectations of long locks and mild wickedness, are in nowise symptoms — at least not of the sort of strength that is required to hold for ever a woman who had opened her eyes to the fact that the good things of the real world are by no means to be despised.

But, once more, it is the eve of battle; and yet do we linger in ladies' bowers? Nay, rather

"Sound, sound the clarion, fill the fife;"

and in fact the clarion — from Redchester, at eighteenpence a-day and as much beer as he can swallow — is sounding to the fray; nor are local drums and fifes wanting to beat and whistle with a heroic disregard of light and shade, of time and tune. Words, as hard as bullets, and almost as telling, are hurled about the place incessantly, and every now and then missiles that are harder still; standards are displayed, union-jack against union-jack, and motto against motto; rosettes begin to enliven frieze and broadcloth, on this side with hue of heaven — on that, with the colour of flowery fields: and the armies rush together in a shower of gold and silver, as though Denethorp were Danaë, wooed by rival Joves. In a word, it is a contested election of the good old days, when men hit at least as hard as they do now, and far more openly.

He who has seen, he who has heard, may picture to himself the outward phenomena of the long exciting weeks that preceded the nomination of a burgess to represent in Parliament the borough of Denethorp. Mr. Prescot came down from London, open-handed, to represent the cause for which, according to the orators who held forth at the Chequers, "Hampden died on the field and Sydney on the scaffold." He made an admirable candidate — far better, it must be confessed, than Hugh. He was, though not an old man, an old hand at such things; and if he was not actually much more wealthy than Madame Clare, and if he did not spend more freely — that was impossible — his resources were much more readily available, and he spent with greater ostentation and *éclat*. He, moreover, had no local prestige to lose. If he won, it did not matter how he won; and if he lost, he lost no more than that one particular contest. And then he was the popular candidate, and had the noise on his side — and that, in an old-fashioned contest, was always a great point in a man's favour. In a state of things in which the sanest of men becomes part of an insane crowd, noise creates sympathy. The ordinary man always likes to add his voice to the loudest chorus; and so "Prescot for ever!" was shouted forth much more often and much more loudly than the similar cry that was given for Lester. But, above all, while the latter was an untried boy, the banker from London was a man of mark and weight, with whose name newspaper politicians were familiar; and while Lester spoke only like a gentleman, and that badly, he spoke like an orator — like a mob-orator it may be, but still like an orator. Altogether he was the very type of a popular candidate; and his party in Denethorp could not have brought down a better man.

Still Hugh had his advantages. A feeling of duty is in itself a source of strength, even in an election; and he honestly believed himself to be the champion of the right. Besides, he was, after all, fighting a stranger upon his own ground — always an immense advantage in every sort of war; for in this respect the truest of proverbs shows its weak side, and familiarity breeds not contempt but confidence. He was popular also, and his manner of canvass was such as to draw upon him no personal ill-will, even from his opponents. That was all reserved for Madam Clare, who drew upon herself a great deal of it, and not without real cause. She made no pretence of concealing her cards, and victory would be of little worth to her unless it was carried by a high hand.

She was, however, wise enough not to trust entirely to herself and her prestige.

It was not without good reason that she placed great reliance upon Mr. George White, her Denethorp solicitor, who, though unused to election contests, was not unequal to them, as Mr. Prescot's more practised agent very soon discovered. And in no way did Miss Clare's lieutenant-general prove his wisdom and discretion better than in first getting hold of Mark Warden, and in afterwards gradually promoting him to be his own first lieutenant. Mr. White was not a man of many words, but this is the opinion of Mark that he, after a week or two of work, expressed to Mr. Brown: —

"If we were fighting for that fellow Warden instead of young Lester, by the Lord! I'd just go to bed at once, and order myself not to be called till after the poll."

The practical man, young as he was, and new to the work, found his labour congenial — far more congenial than he had found Sophocles and Newton. He was the only man on the blue side who could fight the invader with his own peculiar weapons on equal terms. He canvassed indefatigably, and not in too scrupulous a manner; he spoke often and well; and though, as an orator, he was rather apt to talk over the heads of his audience, he thereby gained no little reputation for himself. A mob is always rather flattered by having addressed to it what it does not quite understand. And then, too, he had the advantage over Prescot of being well up in all local allusions; and he had the prestige of having not only been born and bred in the place, but of having become an honour to it besides — a prestige that he and White worked to the uttermost. Perhaps, after all, the cry of "Lester for ever!" was only less loud because for the name "Lester" was so often substituted that of "Warden."

Madam Clare was not slow to see how things were going, and she became not a little jealous. But she made him a welcome visitor at Earl's Dene whenever he had occasion to call there, and treated him as his merits and services deserved. Miss Raymond too, who had caught the election fever in its most intense form — so much so as to become sometimes quite angry with her candidate for not coming out so strongly as he ought — came to treat Warden as the hero of the hour; indeed she heard his praises sung by all around her so often and so loudly that, being a very different sort of young lady from what Miss Clare had been, she quite got rid of the impression that he had somehow made upon her at their first meeting. It was true that he could not ride across country; but then he could talk; and even with more enthusiastic amazons than Alice Raymond the tongue of silver outweighs the best hand that ever lay on bridle, when its owner knows how to use it discreetly. As for Marie, she grew ten times more proud of him than ever, and took such warm though ignorant interest in all he did, that he would have been more than man had he not felt the old chain renew itself in spite of everything.

And then, too, in those exciting, harassing weeks he needed rest sometimes, more especially as the life he was now leading was not well calculated to restore his nervous tone. And where should he find rest? At home? His father now talked nothing but politics, and Mr. Brown, of whom he had to see quite enough during the day, had now become a more frequent evening visitor than ever. At Earl's Dene? Nothing but politics there also; and besides, when he went there he had to exert himself, and to sustain his reputation. Where, in fact, should he find rest but where he ought to find it — that is to say, with Marie?

Nor was he the only visitor at Monsieur Lefort's. He generally confined himself to calling there in the evening; but when he did chance to go there in the daytime, he more than once found Hugh Lester neglecting his interests for a while to hear Mademoiselle Angélique sing.

This sounds but a slight matter, nor did any one concerned see any harm in it. To Marie it would have seemed the most natural thing possible had all the county crowded into the little room to hear the music that she held to be the most beautiful in the world; and, girl as she was, she was not one of those who cannot see two people together without at once leaping to extreme conclusions. Monsieur Lefort did not trouble his head about it — he had other things to think about than such nonsense. Warden could not have seen any danger in it, or he would not rather have encouraged these visits of Lester's than otherwise, with a view to getting his candidate out of the way while he worked to better purpose without him. Lester, one may assume, did not; nor Angélique, one may hope, when one remembers the existence of Félix. What Madam Clare would have thought about it is another thing; but, fortunately for her repose of mind, her nephew did not include his visits to No. 23 in his daily journal of the progress of his canvass. He always had plenty to tell her without alluding to such a trifle.

But the result of it was, that more and more he left Warden to bear the burden and heat of the day alone, and that the latter daily advanced in the trust and confidence

of Earl's Dene. Miss Clare did not like him overmuch; but she trusted him and was grateful to him, and that, with her, meant something better than liking. At all events, if he was setting sail under false colours, it was with a fair and favourable wind.

Songs of a Wayfarer By William Davies. (Longmans.) — Here is a volume containing some six thousand verses or more, as much as some poets have won their immortality by, all written, if we may judge from the dates that are given, in a very short space of time, and all, or nearly all, very much alike. Mr. Davies writes like a modernized Herrick, modernized, it must be understood, both in language and thought, for there is nothing of the grossness which disfigures the *Hesperides*. But is not Herrick, except we take him at his best and for a short time, rather wearisome? Will not any taste pall with this perpetual banquet of fanciful sweets? Here is Mr. Davies when he is in force: —

"A Requiem.

"Peacefully she lies at rest:
Like a blossom some may say,
Blown from apple trees in May;
Hushed the heavings of her breast.

"Fairer wonders could not be:
Pearly shapes so delicate,
They could scarcely find a mate
In the marvels of the sea.

"Little minion-mouthed loves
Stand aghast at Death's eclipse —
Closing eyes and blanching lips —
Blunted arrows, drooping doves.

"See her hand, so small a one,
Made to fit a finer clasp
Than we mortals ever grasp,
In the land where she is gone:
. . . . . .

"Let the lily blossom by her,
And the bended roses bloom
Lean and wan; shut up the tomb,
Winter rains must not not come nigh her.

"Stay awhile your tears and sighs;
Then above her sable hearse
Character this single verse:
'Love is dead and here he lies.'"

"Polyphemus," "The Garden," "Resolutions," are among those that we have read with pleasure. Here Mr. Davies is in a higher mood than usual: —

"Though death should draw thee from this fair domain
And with a little clay seal up thine eyes,
And turn to common air thy breathed sighs,
And make thy tears but drops of April rain;
Yet shall thy sweetness be blown forth again,
And, fed with summer glories, newly rise,
And echoed music of thy lost replies
Be sung once more by birds about the plain:
For beauty ne'er hath limned a fairer face,
Nor Truth and Love e'er lit a brighter eye;
And surely He who is the Lord of grace
Will never let such truth and beauty die,
But though they change their mortal dwelling-place
Their shows shall still survive beneath the sky."

If Mr. Davies can moderate his fluency and fit into his verse some little backbone, so to speak, of thought which is beyond the prettinesses of fancy, he has, we believe, powers enough to do very well. Spectator.

Come to the Woods, and other Poems (Frome, Hodges; London, Simpkin and Marshall). Careful students of the *Christian Year* will remember a little poem, "To the Redbreast," which Keble quotes after his verses for the twenty-first Sunday after Trinity. They were written by the Rev. G. I. Cornish, a Devonshire clergyman, whose sermons and poetical remains Keble himself edited about twenty years ago. The present volume contains what were then published, with additions chiefly consisting of early poems. Few will doubt that they are worth preserving. They are full of freshness and tenderness of feeling, the genuine utterances of a man of piety and culture, tinged indeed, with something of melancholy, and never rising to any great height of power, but always sweet and true. "His Will Be Mine," written, it would seem, when he had left woods and fields for a town charge; "His Saltem," memorial lines to his son, who died and was buried at Winchester; and "The Vale of Otter," are among the pieces which please us best. We quote one or two stanzas from the last: —

"O Sal'ston knoll! I love you well,
And all your beechen skreen;
And yon east hill's continuous swell,
And Otter's brook between;
Your breeze, your waters, and your shade,
Such as it is my being made.

"I love you well, sweet Vale! for here
My stream of life arose;
That stream that through the eternal year
Shall flow as now it flows;
And howso'er it flows, from you
Borrows a still unchanging hue.

"'Tis true; I know not what shall be,
When, all its wanderings ceased,
It joins at length its parent sea;
But this I know at least, —
He who a proper being gave,
That proper being still will save.

"And therefore, if some thoughts of blame
And sorrow round thee cling,
Yet still, sweet Vale! I love thy name;
Thou art a sacred thing;
Alike for evil or for good
I cannot quit thee if I would."

Spectator.

From The Pall Mall Gazette.

"HOME LIFE OF SIR DAVID BREWSTER."*

Of biographies a few of the best, and most of the very worst, in point of interest and truthfulness, have been written by the sons, wives, and daughters of those to which they referred. Some of these are entirely worthless, except that they show the kind of impression which the man's individuality of character was able to make and leave on those with whom he was in daily contact. Even if it were desirable, it is hardly possible that an entirely impartial and independent verdict should be given of a father by his son — for one reason, perhaps, because the type of mind possessed by the first is often inherited by the last. The greater the contrast in this respect, the better the biography is likely to be. It may not be complete or consistent, but we are likely to find in it what no one else could so well give, and some lives written under these conditions afford specimens of a high type of merit. The life and letters of Sydney Smith by his daughter, and the memorials of Thomas Hood by his son are examples of this kind.

This volume of personal recollections of Sir David Brewster, compiled by his daughter, Mrs. Gordon, modestly professes merely to be the "home life" of the philosopher, and is of unusual interest, because Sir David, if ever man did, carried his science into everyday matters, and was singularly unreserved as to the nature and object of his studies and the progress of his discoveries. There are many things in his career which require, not excuse, but more explanation than we meet with here, and we trust that the report is correct which states that his scientific history is to be distinctly traced out and given to the world by some out of the many of his friends who are competent to the task. Brewster had certain gifts the possession of which always places a man in the front rank of whatever army he serves: an iron constitution, an amazingly retentive memory, an immense capacity for work, and a steady patient perseverance which was quite indomitable. He was, withal, genial and social in his intercourse with others.

David was the second son of James Brewster, the rector of the grammar school in Jedburgh, and was born in the Canongate of that town in 1781. He was educated in the way usual with Scotch boys: plenty of hard book work, tolerably sharp discipline, a strict religious training, a discreet liberty for young animal spirits and youthful amusements, and this comprised the reading or recital of a good deal of romance and poetry, and many an old ballad or ghostly legend. The local centralization of talent in Scotland is less excessive than in England, and a hundred years ago this was still more the case. Around Jedburgh there were a number of gentlemen of very considerable scientific and literary attainments, with whom young Brewster associated. With one in particular, Mr. Veitch, a friendship was formed which seems to have continued through life. At twelve years old he was sent to the University of Edinburgh, and was there quickly noticed by Professor Playfair and Dugald Stewart as an extraordinarily accurate and diligent student. At nineteen he was busily occupied in experiments in optics and electricity, and made about that time his first discovery. But at twenty-one we find him studying for the ministry according to his father's wishes, which he appears to have passively accepted. While preparing for this profession, he acted as private tutor in the house of a Scottish gentleman, and soon after was licensed, and preached his first sermon in 1804, at St. Cuthbert's, in Edinburgh. The following year he was, though so young, spoken of as a candidate for the Chair of Mathematics in the University, vacant in consequence of Professor Playfair's resignation, and had the good wishes of Sir William, then Dr. Herschell, with whom he was even then in active correspondence. But, with commendable modesty, on finding a man of Sir John Leslie's eminence in the field, he appears to have withdrawn from the contest. In 1807 he was a candidate for the Mathematical Chair in St. Andrew's University, but unsuccessfully. And now scientific honours of all kinds began to flow in. He was made LL.D. of Aberdeen, M. A. of Cambridge, and a member of the Royal Society of Edinburgh, and commenced the new "Encyclopædia," which, though universally acknowledged to be an admirable and almost exhaustive compilation, was not successful from a pecuniary point of view; and out of it arose a lawsuit, which was for many years a source of continual worry and anxiety.

He was now the intimate associate and correspondent of the most distinguished scientific and literary men of the day, and the amount of work and letter-writing he got through was simply enormous. It was characteristic of the man that he always communicated his observations and discoveries to the world at once and without reserve; so that when only a few hours before his death Sir James Simpson asked if he

* "Home Life of Sir David Brewster." By M. M. Gordon. (Edinburgh: Edmonston & Douglas.)

would like any one in particular to take charge of his scientific papers, he replied, "No: I have done what every scientific man should do — published almost all my observations of any value just as they occurred." In consequence of this custom his miscellaneous communications to the various philosophical publications quickly became both numerous and important. Researches on achromatic eye-pieces, astronometers, telescopes, experiments in optics, crystals, and crystallization, the decomposition and polarization of light, colour, minerals, natural history, magnetism, electricity, the camera, liquids, the stereoscope, photography, &c.— from 1806 to the day of his death these and cognate subjects were patiently and unweariedly studied and lucidly expounded. Wherever he went he examined and remembered everything of intellectual interest with an earnestness, intelligence, and sympathy which resulted in making him an extraordinarily accomplished and many-sided man, both in science and literature. Whatever the Church may have lost, we regard it as fortunate that the application made by him for the living of Sprouston failed after some attendant litigation, and in 1809 he threw himself unreservedly into the career for which he was by nature so thoroughly qualified.

Brewster seems to have been always sufficiently susceptible to feminine attractions, and after one or two transient youthful attachments he married, in 1810, Juliet, the youngest daughter of James Macpherson, Esq., M.P., of Belleville, better known as Ossian Macpherson. Previous to this time his diary, from which Mrs. Gordon quotes, presents a curious medley of notes on crystals, meteoric compounds, and his engagements to dine or sup at the Playfairs, where his intended wife was visiting. Meanwhile the "Encyclopædia," the fruits of so much labour, study, and solicitude, steadily progressed, and in 1830 was completed in eighteen volumes. In 1815 he was made F. R. S. for London, and afterwards obtained the Copley, Rumford, and six of the Royal medals — in each case for fresh discoveries in light; and in 1816 was awarded a prize by the French Institute for the two most important discoveries in physical light made in Europe. In 1816 he invented the kaleidoscope and took out a patent for it, but this was pirated; and Mrs. Gordon states that out of the hundreds of thousands which were sold, the inventor himself never profited one farthing. After this he edited the *Edinburgh Journal of Science* and various solid volumes of translations on geometry, mechanics, astronomy; and was made member of, and received prizes from, almost every learned society in Europe. He was one of the most active promoters of the British Association for the Advancement of Science, established in 1832; and his friends and correspondents at this period furnish a list of brilliant and illustrious names — Arago, Chalmers, Herschell, Davy; Professors Murchison, Owen, Faraday, Playfair, Forbes, and Simpson; Sir W. Scott, Roget, Whewell, Babbage, Hugh Miller, Chudet, Dalton, Sir W. Hamilton, Wheatstone, Carlyle, Chambers, Adams, Buckland, Lord Ross, Le Verrier, Humboldt, Cuvier, La Place, Biot; and Miss Edgeworth, the Hon. Mrs. Norton, Mrs. Somerville, &c.

In 1838 Sir David Brewster accepted the principalship of the University of St. Andrew's, where he was formerly rejected as a professor. There he carried matters with a high hand, and a spirit of energetic reform, which, though not uncalled for, did at first create some opposition. In May, 1843, the disruption of the Scottish Church occured, and foremost among the seceders was Brewster. An ill-judged and narrow-minded effort was made by the Presbytery to eject him from the principalship on this account; but, fortunately for the welfare of the university, this attempt ended in ignoble failure.

Mrs. Gordon has described her father aptly enough as being "a man of war from his youth." From a social point of view no human being could be more courteous, genial, and sympathetic than Sir David; and his perfect forgetfulness of self and transparent guilelessness of manner, and his illustrious reputation, added to other qualities, gave him a certain power of fascination not very easy to describe. His intimate acquaintance with various celebrities, his many and prolonged opportunities, and his retentive memory, made his conversation a fund of anecdote and interest; and he was always ready and able to explain an abstruse scientific experiment in a clear and simple way. For the other sex he had a natural gallantry and determined chivalry of sentiment which made it most difficult for him to admit that any woman could do wrong; so that a certain old lady once affirmed that Sir David's admiration was too universal to confer any special distinction. But towards men he was, at least in moral or intellectual warfare, otherwise disposed, and his language was habitually of the strongest.

With those from whom he sought or to whom he could give information he was the most attentive and delightful of compan-

ions; and to all young aspirants to literary or scientific fame who consulted him he gave cheerfully and untiringly, not indeed his leisure, for of that he had literally none, but his valuable time, his warm sympathy, his best advice, encouragement, and assistance. But, all Scotch professors being credited with a certain irascibility and delight in internecine warfare, Sir David was of all others the most aggressive, resolute, and pugnacious. A false theory, whether about stars, or light, or glaciers, was as a crime in his eyes, and pen in hand, he dealt with it accordingly. He was for many years a steady contributor to the *North British Review*, and the volumes of that publication contain many attacks or reviews by him of theories opposed to his own, which for impetuous vigour, strength, and heartiness of denunciation, were so remarkable that they sometimes created an erroneous impression that his criticism was inspired by personal hostility. On one occasion his wife gently remonstrated with him in regard to certain somewhat unmeasured condemnation which he had dealt out to the author of the "Plurality of Worlds," saying that "such expressions were calculated to hurt his feelings." "Hurt *his* feelings!" broke in Sir David, "why it is he that has hurt *my* feelings!"

Whether in supporting academical or political reforms, curbing the refractory students of St. Andrew's, contending with his brother professors, or demolishing a rival theory, he entered into the mêlée, with a fire which was always at white heat. At the age of eighty-six the Pascal and Newton controversy had the same power to kindle in him a perfect blaze of indignation that the discovery of a scientific error or imposture did in his youthful days; and these features of his natural character remained almost to the last with unabated strength. In this extraordinary vitality of force he closely resembled two of his contemporaries, Lord Palmerston and his old intimate friend Lord Brougham. If he was strenuous in supporting his own claims to certain discoveries, he was scrupulous in doing justice to those of other men; and when, as sometimes occurred, he heard himself credited as the inventor of the stereoscope now in use, he was always careful to explain that not to him but to Wheatstone that was due.

It appears that he was not wholly free from that weakness or love for the weird and the marvellous which is generally found in the natives of mountainous countries, and the number and variety of ghost stories which he would relate were amazing. But, in answer to the question whether he thought it possible to see ghosts, we heard him reply, "Oh, yes! But if a ghost appeared to my eyes descending from the ceiling or rising out of the floor, I should feel my pulse; if it came in at the door or the window, I should lay hold of the poker." His attendance, along with Lord Brougham, at several séances of alleged spirit-rappers, gave rise to much dispute and a good deal of letter writing; but it was hardly probable that the veterans could be hoaxed by this kind of imposture. Of course they saw many tricks for which they could as little account as an ordinary spectator could explain the performances of Professor Anderson; but of one thing they were quite convinced, *i.e.* that spirits were not the agents concerned. In 1850 Brewster sustained a severe affliction in the loss of his wife; his eldest son also died shortly after; and from that time he seems to have spent much of his time in continental travel, without, however, in any degree neglecting his scientific pursuits.

It is not given to many men to find equal pleasure in the study and the world; but in this respect he had a rare capacity for enjoyment. The worship of intellect is one of the commendable weaknesses of the sex, and among the many charming and accomplished women with whom it was his lot to be on terms of close friendship he was always a welcome and favoured guest. He served as one of the jurors in the Exhibition of 1851; and many will remember his tall, slight, upright figure and quick, active step, as he paced along the building in the zealous discharge of his duties.

His strongly-marked features were tinged with a pallor which was habitual to him, but were lighted up by a pair of blue eyes both kindly and choleric, and set in a forest of silvery hair, which gave him an almost leonine appearance. Though upwards of seventy years of age, we find him attending the Queen's Ball, and thoroughly enjoying as many as three engagements in one evening. He had been, in 1849, chosen to succeed Berzelius the celebrated Swedish chemist, as one of the eight Foreign Associates of the French Institute — perhaps the greatest scientific honour which France can bestow on foreigners, and one for which, Baron Cuvier remarked, all the philosophers of Europe compete; and in 1855 he was named juror at the Paris Exhibition for the department of optical instruments, and the Emperor and Prince Napoleon never omitted any opportunity of testifying their esteem for him. The lighthouse controversy should properly belong to the history of Brewster's scientific life;

but there is no doubt that his very important services in the improvement of the lighting apparatus were tardily recognized, and poorly requited by the British Government, and this too in a matter where thousands of lives and property worth millions were at stake.

The power of personal fascination in Brewster seems to have been as much experienced as exercised. In 1856, while staying for the winter at Cannes, he entered into a second marriage with a young English lady — Jane Kirk, the daughter of Thomas Purnell, Esq., of Scarborough; and Sir David's old associates will long remember with pleasure the brightness which her presence shed on the last decade of his life, and the keen-witted, intellectual sympathy with which she entered into her illustrious husband's pursuits, and which she extended to all who were honoured by his friendship. In 1859 Sir D. Brewster was elected Principal of the University of Edinburgh, where new and arduous duties waited for him; but, as with Arago, "travaillez, travaillez bien," was his motto, and for eight years longer his physical and intellectual energies remained vigorous and intact. But at the meeting of the British Association at Dundee, in 1867, a fainting fit which siezed him was the signal for a gradual yet rapid decay. He met death with the calm and courage which befitted the man of blameless life, the philosopher, and the Christian. This event took place February 10, 1868, at his own house — Ullery, which overlooks, from the other side of the Tweed, Melrose Abbey, where his remains now rest; and it is a characteristic fact that only the day before he had explained to Sir J. Simpson, with extreme clearness and accuracy, some optical phenomena he had latterly observed in his own vision, and which he inferred to be a form of amaurosis not uncommon in the failing eyes of aged persons.

Mrs. Gordon, has, on the whole, performed a delicate task with excellent judgment and taste. The phraseology of the latter part of the book is disfigured by the frequent use of certain terms which only find acceptance with a particular theological school; and the no doubt sincere but strong religious views of the writer have in the few concluding chapters so tinged the narrative as to convey a distorted, and, as we think, erroneous impression of Sir David's real character. Nevertheless, we recommend the volume for perusal. With his own countrymen it is sure of a welcome, and to the *savants* of Europe and of the New World it will have a real and special interest of its own.

From the conclusion of *The Saturday Review's* article we copy a few lines.

We are not surprised, however, that a daughter should linger round her father's death-bed, and Mrs. Gordon perhaps has more justification than most biographers. For her father's death was characteristic of his life. It must have been a touching sight to see the aged man struggling to add one more week of hard work to the fourscore years during which he had laboured so hard. At last he had finished everything; written his letters, arranged his papers, and played two games of dominoes with his little daughter. He then rose up to go to lie down for the last time. "As he left his study he said quietly, 'Now you may turn the key, for I shall never be in that room again.' When he undressed he said, 'Take away my clothes, this is the last time I shall wear them'; and when he lay down, 'I shall never rise again from this bed.'" In three days he was dead.

WARMING RAILWAY CARRIAGES. — It is greatly to be regretted that we are, remarks the *Globe*, behind the rest of the world in warming our railway carriages, as in everything else. Mr. Berchau has earned a brilliant ring from the Empress of Russia by the entire success of his plan for warming a whole train of railway carriages without expense. Everybody knows that so great is the heat produced by the friction of the axle-trees in the boxes of the wheels of railway carriages that unless they are kept lubricated and cool with a mixture of grease they heat to the extent of setting the wood-work of the carriages on fire. A moment's thought must suffice to suggest that a few disks attached to the axle-trees of the carriages would by friction with proper apparatus generate enough heat to warm all the carriages pleasantly without appreciable cost; only the wear and tear of material. How comes it that this simple idea has never occurred to any English engineer, or been thought worthy of working out? And how comes it that now when the invention is ready to our hands we do not take advantage of it?

From Fraser's Magazine.

A BISHOP OF THE TWELFTH CENTURY.*

To the sceptical student of the nineteenth century the ecclesiastical biographies of mediæval Europe are for the most part unprofitable studies. The writers of them were generally monks. The object for which they were composed was either the edification of the brethren of the convent or the glorifying of its founder or benefactor. The Holy See in considering a claim to canonization disregarded the ordinary details of character and conduct. It dwelt exclusively on the exceptional and the wonderful, and the noblest of lives possessed but little interest for it unless accompanied by evidence of miracles, performed directly by the candidate while on earth or by his relics after his departure. Instead of pictures of real men the biographers present us with glorified images of what, in their opinion, the Church heroes ought to have been. St. Cuthbert becomes as legendary as Theseus, and the authentic figure is swathed in an embroidered envelope of legends through which usually no trace of the genuine lineaments is allowed to penetrate.

It happens, however, occasionally, that in the midst of the imaginative rubbish which has thus come down to us, we encounter something of a character entirely different. We find ourselves in the hands of writers who themselves saw what they describe, who knew as well as we know the distinction between truth and falsehood, and who could notice and appreciate genuine human qualities. Amidst the obscure forms of mediæval history we are brought face to face with authentic flesh and blood, and we are able to see in clear sunlight the sort of person who, in those ages, was considered especially admirable, and, alive or dead, was held up to the reverence of mankind. To one of these I propose in the present article to draw some brief attention. It is the life of St. Hugo of Avalon, a monk of the Grande Chartreuse who was invited by Henry II. into England, became Bishop of Lincoln, and was the designer, and in part builder, of Lincoln Cathedral. The biographer was his chaplain and constant companion — Brother Adam — a monk like himself, though of another order, who became afterwards Abbot of Ensham; and having learnt, perhaps from the bishop himself, the detestableness of lying, has executed his task with simple and scrupulous fidelity. The readers whose interests he was considering were, as usual, the inmates of convents. He omits, as he himself tells us, many of the outer and more secular incidents of the bishop's life, as unsuited to his audience. We have glimpses of kings, courts, and great councils, with other high matters of national moment. The years which the bishop spent in England were rich in events. There was the conquest of Ireland; there were Welsh and French wars; the long struggle of Henry II. and his sons, and when Henry passed away there was the Grand Crusade. Then followed the captivity of Cœur de Lion and the treachery of John; and Hugo's work, it is easy to see, was not confined to the management of his diocese. On all this, however, Abbot Adam observes entire silence, not considering our curiosity, but the concerns of the souls of his own monks whom he would not distract by too lively representations of the world which they had abandoned.

The book, however, as it stands is so rare a treasure that we will waste no time in describing what it is not. Within its own compass it contains the most vivid picture which has come down to us of England as it then was, and of the first Plantagenet kings.

Bishop Hugo came into the world in the mountainous country near Grenoble, on the borders of Savoy. Abbot Adam dwells with a certain pride upon his patron's parentage. He tells us indeed, sententiously, that it is better to be noble in morals than to be noble in blood — that to be born undistinguished is a less misfortune than to live so — but he regards a noble family only as an honourable setting for a nature which was noble in itself. The bishop was the third child of a Count of Avalon, and was born in a castle near Pontcharra. His mother died when he was eight years old; and the Count having lost the chief interest which bound him to life, divided his estates between his two elder sons and withdrew with the little one into an adjoining monastery. There was a college attached to it where the sons of many of the neighbouring barons were educated. Hugo, however, was from the first designed for a religious life, and mixed little with the other boys. "You, my little fellow," his tutor said to him, "I am bringing up for Christ: you must not learn to play or trifle." The Count became a monk. Hugo grew up beside him in the convent, waiting on him as he became infirm, and smoothing the downward road; and meanwhile learn-

* *Magna Vita S. Hugonis Episcopi Lincolnensis.* From MSS. in the Bodleian Library, Oxford, and the Imperial Library, Paris. Edited by the Rev. James F. Dimock, M.A., Rector of Bamburgh, Yorkshire.

ing whatever of knowledge and practical piety his preceptors were able to provide. The life, it is likely, was not wanting in austerity, but the comparatively easy rule did not satisfy Hugo's aspirations. The theory of "religion," as the conventual system in all its forms was termed, was the conquest of self, the reduction of the entire nature to the control of the better part of it; and as the seat of self lay in the body, as temptation to do wrong, then as always, lay, directly or indirectly, in the desire for some bodily indulgence, or the dread of some bodily pain, the method pursued was the inuring of the body to the hardest fare, and the producing indifference to cold, hunger, pain, or any other calamity which the chances of life could inflict upon it. Men so trained could play their part in life, whether high or low, with wonderful advantage. Wealth had no attraction for them. The world could give them nothing which they had learnt to desire, and take nothing from them which they cared to lose. The orders, however, differed in severity; and at this time the highest discipline, moral and bodily, was to be found only among the Carthusians. An incidental visit with the prior of his own convent to the Grande Chartreuse, determined Hugo to seek admission into this extraordinary society.

It was no light thing which he was undertaking. The majestic situation of the Grande Chartreuse itself, the loneliness, the seclusion, the atmosphere of sanctity, which hung around it, the mysterious beings who had made their home there, fascinated his imagination. A stern old monk, to whom he first communicated his intention, supposing that he was led away by a passing fancy, looked grimly at his pale face and delicate limbs, and roughly told him that he was a fool. "Young man," the monk said to him, "the men who inhabit these rocks are hard as the rocks themselves. They have no mercy on their own bodies and none on others. The dress will scrape the flesh from your bones. The discipline will tear the bones themselves out of such frail limbs as yours."

The Carthusians combined in themselves the severities of the hermits and of the regular orders. Each member of the fraternity lived in his solitary cell in the rock, meeting his companions only in the chapel, or for instruction or for the business of the house. They ate no meat. A loaf of bread was given to every brother on Sunday morning at the refectory door, which was to last him through the week. An occasional mess of gruel was all that was allowed in addition. His bedding was a horse-cloth, a pillow, and a skin. His dress was a horse-hair shirt, covered *outside* with linen, which was worn night and day, and the white cloak of the order, generally a sheepskin, and unlined — all else was bare. He was bound by vows of the strictest obedience. The order had business in all parts of the world. Now some captive was to be rescued from the Moors; now some earl or king had been treading on the Church's privileges; a brother was chosen to interpose in the name of the Chartreuse: he received his credentials and had to depart on the instant, with no furniture but his stick, to walk, it might be, to the furthest corner of Europe.

A singular instance of the kind occurs incidentally in the present narrative. A certain brother Einard, who came ultimately to England, had been sent to Spain, to Granada, to Africa itself. Returning through Provence he fell in with some of the Albigenses, who spoke slightingly of the sacraments. The hard Carthusian saw but one course to follow with men he deemed rebels to his Lord. He was the first to urge the crusade which ended in their destruction. He roused the nearest orthodox nobles to arms, and Hugo's biographer tells delightfully how the first invasions were followed up by others on a larger scale; and "the brute and pestilent race, unworthy of the name of men, were cut away by the toil of the faithful, and by God's mercy destroyed."

"Pitiless to themselves," as the old monk said, "they had no pity on any other man," as Einard afterwards was himself to feel. Even Hugo at times disapproved of their extreme severity. "God," he said, alluding to some cruel action of the society, "God tempers his anger with compassion. When he drove Adam from Paradise, he at least gave him a coat of skins: man knows not what mercy means."

Einard, after this Albigensian affair, was ordered in the midst of a bitter winter to repair to Denmark. He was a very aged man — a hundred years old, his brother monks believed — broken at any rate with age and toil. He shrunk from the journey, he begged to be spared, and when the command was persisted in, he refused obedience. He was instantly expelled — half-clad, amidst the ice and snow, he wandered from one religious house to another. In all he was refused admission. At last, one bitter frosty night he appeared penitent at the gate of the Chartreuse, and prayed to be forgiven. The porter was forbidden to open to him till morning, but left the old man to shiver in the snow through the darkness.

"By my troth, brother," Einard said the

next day to him, "by my troth, brother, had you been a bean last night, between my teeth, I should have chopped you in pieces in spite of myself."

Such were the monks of the Chartreuse, among whom the son of the Count of Avalon desired to be enrolled, as the highest favour which could be shown him upon earth. His petition was entertained. He was allowed to enlist in the spiritual army, in which he rapidly distinguished himself; and at the end of twenty years he had acquired a name through France as the ablest member of the world-famed fraternity.

It was at this time, somewhere about 1174, that Henry II. conceived the notion of introducing the Carthusians into England. In the premature struggle to which he had committed himself with the Church, he had been hopelessly worsted. The constitutions of Clarendon had been torn in pieces. He had himself, of his own accord, done penance at the shrine of the murdered Becket. The haughty sovereign of England, as a symbol of the sincerity of his submission, had knelt in the chapter-house of Canterbury, presenting voluntarily there his bare shoulders to be flogged by the monks. His humiliation, so far from degrading him, had restored him to the affection of his subjects, and his endeavour thenceforward was to purify and reinvigorate the proud institution against which he had too rashly matched his strength.

In pursuance of this policy he had applied to the Chartreuse for assistance, and half a dozen monks, among them brother Einard whose Denmark mission was exchanged for the English, had been sent over and established at Witham, a village not far from Frome in Somersetshire. Sufficient pains had not been taken to prepare for their reception. The Carthusians were a solitary order and required exclusive possession of the estates set apart for their use. The Saxon population were still in occupation of their holdings, and being Crown tenants, saw themselves threatened with eviction in favour of foreigners. Quarrels had arisen and ill-feeling, and the Carthusians, proud as the proudest of nobles, and considering that in coming to England they were rather conferring favours than receiving them, resented the being compelled to struggle for tenements which they had not sought or desired. The first prior threw up his office and returned to the Chartreuse. The second died immediately after of chagrin and disgust, and the king, who was then in Normandy, heard to his extreme mortification that the remaining brethren were threatening to take staff in hand and march back to their homes. The Count de Maurienne to whom he communicated his distress mentioned Hugo's name to him. It was determined to send for Hugo, and Fitzjocelyn Bishop of Bath with other venerable persons carried the invitation to the Chartreuse.

To Hugo himself, meanwhile, as if in preparation for the destiny which was before him, a singular experience was at that moment occurring. He was now about forty years old. It is needless to say that he had duly practised the usual austerities prescribed by his rule. Whatever discipline could do to kill the carnal nature in him had been carried out to its utmost harshness. He was a man, however, of great physical strength. His flesh was not entirely dead, and he was going where superiority to worldly temptation would be specially required. Just before Fitzjocelyn arrived he was assailed suddenly by emotions so extremely violent that he said he would rather face the pains of Gehenna than encounter them again. His mind was unaffected, but the devil had him at advantage in his sleep. He prayed, he flogged himself, he fasted, he confessed; still Satan was allowed to buffet him, and though he had no fear for his soul, he thought his body would die in the struggle. One night in particular the agony reached its crisis. He lay tossing on his uneasy pallet, the angel of darkness trying with all his allurements to tempt his conscience into acquiescence. An angel from above appeared to enter the cell as a spectator of the conflict. Hugo imagined that he sprung to him, clutched him, and wrestled like Jacob with him to extort a blessing but could not succeed; and at last he sank exhausted on the ground. In the sleep or the unconsciousness which followed, an aged prior of the Chartreuse who had admitted him as a boy to the order, had died and had since been canonized, seemed to lean over him as he lay and inquired the cause of his distress. He said that he was afflicted to agony by the law of sin that was in his members, and unless some one aided him he would perish. The saint drew from his breast what appeared to be a knife, opened his body, drew a fiery mass of something from the bowels, and flung it out of the door. He awoke and found that it was morning and that he was perfectly cured.

"Did you never feel a return of these motions of the flesh?" asked Adam, when Hugo related the story to him.

"Not never," Hugo answered, "but never to a degree that gave me the slightest trouble."

"I have been particular," wrote Adam

afterwards, "to relate this exactly as it happened, a false account of it having gone abroad that it was the Blessed Virgin who appeared instead of the prior," and that Hugo was relieved by an operation of a less honourable kind.

Visionary nonsense the impatient reader may say: and had Hugo become a dreamer of the cloister, a persecutor like St. Dominic, or a hysterical fanatic like Ignatius Loyola, we might pass it by as a morbid illusion. But there never lived a man to whom the word morbid could be applied with less propriety. In the Hugo of Avalon with whom we are now to become acquainted, we shall see nothing but the sunniest cheerfulness, strong masculine sense, inflexible purpose, uprightness in word and deed; with an ever-flowing stream of genial and buoyant humour.

In the story of the temptation, therefore, we do but see the final conquest of the selfish nature in him, which left his nobler qualities free to act, wherever he might find himself.

Fitzjocelyn anticipating difficulty had brought with him the Archbishop of Grenoble to support his petition. He was received at first with universal clamour. Hugo was the brightest jewel of the order; Hugo could not be parted with for any prince on earth. He himself, entirely happy where he was, anticipated nothing but trouble, but left his superiors to decide for him. At length sense of duty prevailed. The brethren felt that he was a shining light, of which the world must not be deprived. The Archbishop of Grenoble reminded them that Christ had left heaven and come to earth for sinners' souls, and that his example ought to be imitated. It was arranged that Hugo was to go, and a few weeks later he was at Witham.

He was welcomed there as an angel from heaven. He found everything in confusion, the few monks living in wattled huts in the forest, the village still in possession of its old occupants, and bad blood and discontent on all hands. The first difficulty was to enter upon the lands without wrong to the people, and the history of a large eviction in the twelfth century will not be without its instructiveness even at the present day. One thing Hugo was at once decided upon, that the foundation would not flourish if it was built upon injustice. He repaired to Henry, and as a first step induced him to offer the tenants (crown serfs or villains) either entire enfranchisement or farms of equal value, on any other of the royal manors, to be selected by themselves. Some chose one, some the other. The next thing was compensation for improvements, houses, farm-buildings, and fences erected by the people at their own expense. The crown, if it resumed possession, must pay for these, or wrong would be done. "Unless your majesty satisfy these poor men to the last obol," said Hugo to Henry, "we cannot take possession."

The king consented, and the people, when the prior carried back the news of the arrangement, were satisfied to go.

But this was not all. Many of them were removing no great distance, and could carry with them the materials of their houses. Hugo resolved that they should keep these things, and again marched off to the court.

"My lord," said Hugo, "I am but a new comer in your realm, and I have already enriched your majesty with a quantity of cottages and farm steadings."

"Riches I could well have spared," said Henry, laughing. "You have almost made a beggar of me. What am I to do with old huts and rotten timber?"

"Perhaps your majesty will give them to me," said Hugo. "It is but a trifle," he added, when the king hesitated. "It is my first request, and only a small one."

"This is a terrible fellow that we have brought among us," laughed the king; "if he is so powerful with his persuasions, what will he do if he tries force? Let it be as he says. We must not drive him to extremities."

Thus, with the good will of all parties, and no wrong done to any man, the first obstacles were overcome. The villagers went away happy. The monks entered upon their lands amidst prayers and blessings, the king himself being as pleased as any one at his first experience of the character of Prior Hugo.

He had soon occasion to see more of him. He had promised to build the monks a house and chapel, but between Ireland, and Wales, and Scotland, and his dominions in France, and his three mutinous sons, he had many troubles on his hands. Time passed and the building was not begun, and Hugo's flock grew mutinous once more; twice he sent Henry a reminder, twice came back fair words and nothing more. The brethren began to hint that the prior was afraid of the powers of this world, and dared not speak plainly, and one of them, Brother Gerard, an old monk with high blood in his veins, declared that he would himself go and tell Henry some unpleasant truths. Hugo had discovered in his interviews with him that the king was no ordinary man, "vir sagacis ingenii, et inscrutabilis fere animi." He made no opposition,

but he proposed to go himself along with this passionate gentleman, and he, Gerard, and the aged Einard, who was mentioned above, went together as a deputation.

The king received them as "cœlestes angelos," — angels from heaven. He professed the deepest reverence for their characters, and the greatest anxiety to please them, but he said nothing precise and determined, and the fiery Gerard burst out as he intended. Carthusian monks, it seems, considered themselves entitled to speak to kings on entirely equal terms. "Finish your work or leave it, my lord king," the proud Burgundian said. "It shall no more be any concern to me. You have a pleasant realm here in England, but for myself I prefer to take my leave of you and go back to my desert Chartreuse. You give us bread, and you think you are doing a great thing for us. We do not need your bread. It is better for us to return to our Alps. You count money lost which you spend on your soul's health; keep it then since you love it so dearly. Or rather, you cannot keep it; for you must die and let it go to others who will not thank you."

Hugo tried to check the stream of words, but Gerard and Einard were both older than he, and refused to be restrained.

"Regem videres philosophantem;" the king bore it like a philosopher. His face did not alter, nor did he speak a word till the Carthusian had done.

"And what do you think, my good fellow," he said at last, after a pause, looking up and turning to Hugo; "will you forsake me too?"

"My lord," said Hugo, "I am less desperate than my brothers. You have much work upon your hands, and I can feel for you. When God shall please you will have leisure to attend to us."

"By my soul," Henry answered, "you are one that I will never part with while I live."

He sent workmen at once to Witham. Cells and chapel were duly built. The trouble finally passed away, and the Carthusian priory taking root became the English nursery of the order, which rapidly spread.

Hugo himself continued there for eleven years, leaving it from time to time on business of the Church, or summoned, as happened more and more frequently, to Henry's presence. The king, who had seen his value, who knew that he could depend upon him to speak the truth, consulted him on the most serious affairs of state, and beginning with respect, became familiarly and ardently attached to him. Witham however remained his home, and he returned to it always as to a retreat of perfect enjoyment. His cell and his dole of weekly bread gave him as entire satisfaction as the most luxuriously furnished villa could afford to one of ourselves, and long after, when he was called elsewhere, and the cares of the great world fell more heavily upon him, he looked to an annual month at Witham for rest of mind and body, and on coming there he would pitch away his grand dress and jump into his sheepskin as we moderns put on our shooting jackets.

While he remained Prior he lived in perfect simplicity and unbroken health of mind and body. The fame of his order spread fast, and with its light the inseparable shadow of superstition. Witham became a place of pilgrimage; miracles were said to be worked by involuntary effluences from its occupants. Then and always Hugo thought little of miracles, turned his back on them for the most part, and discouraged them if not as illusions yet as matters of no consequence. St. Paul thought one intelligible sentence containing truth in it was better than a hundred in an unknown tongue. The Prior of Witham considered that the only miracle worth speaking of was the holiness of life. "Little I," writes Adam (parvulus ego), "observed that he worked many miracles himself, but he paid no attention to them." Thus he lived for eleven years with as much rational happiness as, in his opinion, human nature was well capable of. When he lay down upon his horse-rug he slept like a child undisturbed, save that at intervals, as if he was praying he muttered a composed Amen. When he awoke he rose and went about his ordinary business; cleaning up dirt of all kinds, washing dishes and such like, being his favourite early occupation.

The Powers, however — who, according to the Greeks, are jealous of human felicity — thought proper, in due time to disturb the Prior of Witham. Towards the end of 1183 Walter de Coutances was promoted from the bishopric of Lincoln to the archbishopric of Rouen. The see lay vacant for two years and a half, and a successor was now to be provided. A great council was sitting at Ensham on business of the realm; the king riding over every morning from Woodstock. A deputation of canons from Lincoln came to learn his pleasure for the filling up the vacancy. The canons were directed to make a choice for themselves and were unable to agree, for the not unnatural reason that each canon considered the fittest person to be himself. Some one (Adam does not mention the name) sug-

gested, as a way out of the difficulty, the election of Hugo of Witham. The canons being rich, well to do, and of the modern easy-going sort, laughed at the suggestion of the poor Carthusian. They found to their surprise, however, that the king was emphatically of the same opinion, and that Hugo and nobody else was the person that he intended for them.

The king's pleasure was theirs. They gave their votes, and despatched a deputation over the downs to command the prior's instant presence at Ensham.

A difficulty rose where it was least expected. Not only was the "Nolo episcopari" in Hugo's case a genuine feeling, not only did he regard worldly promotion as a thing not in the least attractive to him; but in spite of his regard for Henry he did not believe that the king was a proper person to nominate the prelates of the Church. He told the canons that the election was void. They must return to their own cathedral, call the chapter together, invoke the Holy Spirit; put the king of England out of their minds, and consider rather the King of kings: and so, and not otherwise, proceed with their choice.

The canons, wide-eyed with so unexpected a reception, retired with their answer. Whether they complied with the spirit of Hugo's direction may perhaps be doubted. They, however, assembled at Lincoln with the proper forms, and repeated the election with the external conditions which he had prescribed. As a last hope of escape he appealed to the Chartreuse, declaring himself unable to accept any office without orders from his superiors; but the authorities there forbade him to decline; and a fresh deputation of canons having come for his escort, he mounted his mule with a heavy heart and set out in their company, first for Winchester to be accepted by the king, and thence for Lincoln to be anointed.

A glimpse of the party we are able to catch upon their journey. Though it was seven hundred years since, the English September was probably much like what it is at present, and the down country cannot have materially altered. The canons had their palfreys richly caparisoned with gilt saddle-cloths, and servants and sumpter horses. The bishop elect strapped his wardrobe, his blanket and sheepskin, at the back of his saddle. He rode in this way resisting remonstrance till close to Winchester, when the canons, afraid of the ridicule of the court, slit the leathers without his knowing it, and passed his baggage to the servants.

Consecration and installation duly followed, and it was supposed that Hugo, a humble monk, owing his promotion to the king, would be becomingly grateful, that he would become just a bishop like anybody else, complying with established customs, moving in the regular route, and keeping the waters smooth.

All parties were disagreeably, or rather, as it turned out ultimately, agreeably surprised. The first intimation which he gave that he had a will of his own followed instantly upon his admission. Corruption or quasi-corruption had gathered already round ecclesiastical appointments. The Archdeacon of Canterbury put in a claim for consecration fees, things in themselves without meaning or justice, but implying that a bishopric was a prize the lucky winner of which was expected to be generous.

The new prelate had no such estimate of the nature of his appointment — he said he would give as much for his cathedral as he had given for his mitre, and left the archdeacon to his reflections.

No sooner was he established and had looked about him, than from the poor tenants of estates of the see he heard complaints of that most ancient of English grievances — the game laws. Hugo, who himself touched no meat, was not likely to have cared for the chase. He was informed that venison must be provided for his installation feast. He told his people to take from his park what was necessary — three hundred stags if they pleased, so little he cared for preserving them; but neither was he a man to have interfered needlessly with the recognized amusements of other people. There must have been a case of real oppression, or he would not have meddled with such things. The offender was no less a person than the head keeper of the king himself. Hugo, failing to bring him to reason with mild methods, excommunicated him, and left him to carry his complaints to Henry. It happened that a rich stall was at the moment vacant at Lincoln. The king wanted it for one of his courtiers, and gave the bishop an opportunity of redeeming his first offence by asking for it as a favour to himself. Henry was at Woodstock; the bishop, at the moment, was at Dorchester, a place in his diocese thirteen miles off. On receiving Henry's letter the bishop bade the messenger carry back for answer that prebendal stalls were not for courtiers but for priests. The king must find other means of rewarding temporal services. Henry, with some experience of the pride of ecclesiastics, was unprepared for so abrupt a message — Becket himself had been less insolent — and as he

had been personally kind to Hugh, he was hurt as well as offended. He sent again to desire him to come to Woodstock, and prepared, when he arrived, to show him that he was seriously displeased. Then followed one of the most singular scenes in English history — a thing veritably true, which oaks still standing in Woodstock Park may have witnessed. As soon as word was brought that the bishop was at the park gate, Henry mounted his horse, rode with his retinue into a glade in the forest, where he alighted, sat down upon the ground with his people, and in this position prepared to receive the criminal. The bishop approached — no one rose or spoke. He saluted the king; there was no answer. Pausing for a moment, he approached, pushed aside gently an earl who was sitting at Henry's side, and himself took his place. Silence still continued. At last, Henry looking up, called for a needle and thread; he had hurt a finger of his left hand. It was wrapped with a strip of linen rag, the end was loose, and he began to sew. The bishop watched him through a few stitches, and then, with the utmost composure, said to him — "Quam similis es modo cognatis tuis de Falesiâ" — "your highness now reminds me of your cousins of Falaise." The words sounded innocent enough — indeed, entirely unmeaning. Alone of the party, Henry understood the allusion; and, overwhelmed by the astonishing impertinence, he clenched his hands, struggled hard to contain himself, and then rolled on the ground in convulsions of laughter.

"Did you hear," he said to his people when at last he found words; "did you hear how this wretch insulted us? The blood of my ancestor the Conqueror, as you know, was none of the purest. His mother was of Falaise, which is famous for its leather work, and when this mocking gentleman saw me stitching my finger, he said I was showing my parentage."

"My good sir," he continued, turning to Hugo, "what do you mean by excommunicating my head keeper, and when I make a small request of you, why is it that you not only do not come to see me, but do not send me so much as a civil answer?"

"I know myself," answered Hugo, gravely, "to be indebted to your highness for my late promotion. I considered that your highness's soul would be in danger if I was found wanting in the discharge of my duties; and therefore it was that I used the censures of the Church when I held them necessary, and that I resisted an improper attempt on your part upon a stall in my cathedral. To wait on you on such a subject I thought superfluous, since your highness approves, as a matter of course, of whatever is rightly done in your realm."

What could be done with such a bishop? No one knew better than Henry the truth of what Hugo was saying, or the worth of such a man to himself. He bade Hugo proceed with the keeper as he pleased. Hugo had him publicly whipped, then absolved him, and gave him his blessing, and found in him ever after a fast and faithful friend. The courtiers asked for no more stalls, and all was well.

In Church matters in his own diocese he equally took his own way. Nothing could be more unlike than Hugo to the canons whom he found in possession; yet he somehow bent them all to his will, or carried their wills with his own. "Never since I came to the diocese," he said to his chaplain, "have I had a quarrel with my chapter. It is not that I am easy-going — sum enim reverà pipere mordacior; pepper is not more biting than I can be. I often fly out for small causes; but they take me as they find me. There is not one who distrusts my love for him, nor one by whom I do not believe myself to be loved."

At table this hardest of monks was the most agreeable of companions. Though no one had practised abstinence more severe, no one less valued it for its own sake, or had less superstition or foolish sentiment about it. It was, and is, considered sacrilege in the Church of Rome to taste food before saying mass. Hugo, if he saw a priest who was to officiate exhausted for want of support, and likely to find a difficulty in getting through his work, would order him to eat as a point of duty, and lectured him for want of faith if he affected to be horrified.

Like all genuine men, the bishop was an object of special attraction to children and animals. The little ones in every house that he entered were always found clinging about his legs. Of the attachment of other creatures to him, there was one very singular instance. About the time of his installation there appeared on the mere at Stow Manor, eight miles from Lincoln, a swan of unusual size, which drove the other male birds from off the water. Abbot Adam, who frequently saw the bird, says that he was curiously marked. The bill was saffron instead of black, with a saffron tint on the plumage of the head and neck; and the abbot adds, he was as much larger than other swans as a swan is larger than a goose. On the occasion of the

bishop's first visit to the manor, he was brought to him to be seen as a curiosity. He was usually unmanageable and savage; but the bishop knew the way to his heart; fed him and taught him to poke his head into the pockets of his frock to look for bread-crumbs, which he did not fail to find there. Ever after, he seemed to know instinctively when the bishop was expected, flew trumpeting up and down the lake, slapping the water with his wings; when the horses approached, he would march out upon the grass to meet them; strutted at the bishop's side, and would sometimes follow him up stairs.

It was a miracle of course to the general mind, though explicable enough to those who have observed the physical charm which men who take pains to understand animals are able to exercise over them.

To relate, or even to sketch, Bishop Hugo's public life in the fourteen years that he was at Lincoln, would be beyond the compass of a magazine article. The materials indeed do not exist: for Abbot Adam's life is but a collection of anecdotes; and out of them it is only possible here to select a few at random. King Henry died two years after the scene at Woodstock; then came the accession of Cœur de Lion, the Crusade, the king's imprisonment in Austria, and the conspiracy of John. Glimpses can be caught of the bishop in these stormy times quelling insurgent mobs — in Holland, with his brother William of Avalon, encountering a military insurrection; single-handed and unarmed, overawing a rising at Northampton, when the citizens took possession of the great church, and swords were flashing, and attendant chaplains fled terrified, and hid themselves behind the altars.

These things however, glad as we should be to know more of them, the abbot merely hints at, confining himself to subjects more interesting to the convent recluses for whose edification he was writing.

But in whatever circumstances he lets us see the bishop, it is always the same simple, brave, unpretending, wise figure, one to whom nature had been lavish of her fairest gifts, and whose training, to modern eyes so unpromising, had brought out all that was best in him.

Among the most deadly disorders which at that time prevailed in England was leprosy. The wretched creatures afflicted with so loathsome a disease were regarded with a superstitious terror: as the objects in some special way of the wrath of God. They were outlawed from the fellowship of mankind, and left to perish in misery.

The bishop, who had clearer views of the nature and causes of human suffering, established hospitals on his estate for these poor victims of undeserved misery, whose misfortunes appeared to him to demand special care and sympathy. To the horror of his attendants, he persisted in visiting them himself; he washed their sores with his own hands, kissed them, prayed over them, and consoled them.

"Pardon, blessed Jesus," exclaims Adam, "the unhappy soul of him who tells the story! when I saw my master touch those bloated and livid faces; when I saw him kiss the bleared eyes or eyeless sockets, I shuddered with disgust. But Hugo said to me that these afflicted ones were flowers of Paradise, pearls in the coronet of the Eternal King waiting for the coming of their Lord, who in his own time would change their forlorn bodies into the likeness of his own glory."

He never altered his own monastic habits. He never parted with his hair shirt, or varied from the hardness of the Carthusian rule; but he refused to allow that it possessed any particular sanctity. Men of the world affected regret sometimes to him that they were held by duty to a secular life. The kingdom of God, he used to answer, was not made up of monks and hermits. God, at the day of judgment, would not ask a man why he had not been a monk, but why he had not been a Christian. Charity in the heart, truth in the tongue, chastity in the body were the virtues which God demanded: and chastity, to the astonishment of his clergy, he insisted was to be found as well among the married as the unmarried. The wife was as honourable as the virgin. He allowed women (Adam's pen trembles as he records it) to sit at his side at dinner; and had been known to touch and even to embrace them. "Woman," he once said remarkably, "has been admitted to a higher privilege than man. It has not been given to man to be the father of God. To woman it has been given to be God's mother."

Another curious feature about him was his eagerness to be present, whenever possible, at the burial of the dead. He never allowed any one of his priests to bury a corpse if he were himself within reach. If a man had been good, he said he deserved to be honoured. If he had been a sinner, there was the more reason to help him. He would allow nothing to interfere with a duty of this kind; and in great cities he would spend whole days by the side of graves. At Rouen once he was engaged to dinner with King Richard himself, and kept

the king and the court waiting for him while he was busy in the cemetery. A courtier came to fetch him. "The king needn't wait," he only said. "Let him go to dinner in the name of God. Better the king dine without my company, than that I leave my Master's work undone."

Gentle and affectionate as he shows himself in such traits as these, still, as he said, he was *pipere mordacior* — more biting than pepper. When there was occasion for anger there was fierce lightning in him; he was not afraid of the highest in the land.

The cause for which Becket died was no less dear to Hugh. On no pretext would he permit innovation on the Church's privileges, and he had many a sharp engagement with the primate, Archbishop Hubert, who was too complaisant to the secular power. An instance or two may be taken at random. There was a certain Richard de Waure in his diocese, a younger son of a noble house, who was in deacon's orders, but the elder brother having died childless, was hoping to relapse into the lay estate. This Richard in some one of the many political quarrels of the day brought a charge of treason against Sir Reginald de Argentun, one of the bishop's knights. As he was a clerk in orders the bishop forbade him to appear as prosecutor in a secular court or cause. Cœur de Lion and Archbishop Hubert ordered him to go on. The bishop suspended him for contumacy, the archbishop removed the suspension. The bishop pronounced sentence of excommunication; the archbishop, as primate and legate, issued letters of absolution, which Richard flourished triumphantly in the bishop's face.

"If my lord archbishop absolve you a hundred times," was Hugh's answer, "a hundred times I will excommunicate you again. Regard my judgment as you will, I hold you bound while you remain impenitent." Death ended the dispute. The wretched Richard was murdered by one of his servants.

Another analogous exploit throws curious light on the habits of the times. Riding once through St. Alban's he met the sheriff with the *posse comitatus* escorting a felon to the gallows. The prisoner threw himself before the bishop and claimed protection. The bishop reined in his horse and asked who the man was.

"My lord," said the sheriff shortly, "it is no affair of yours; let us pass and do our duty."

"Eh!" then said Hugo. "Blessed be God; we will see about that; make over the man to me; and go back and tell the judges that I have taken him from you."

"My lords judges," he said, when they came to remonstrate, "I need not remind you of the Church's privilege of sanctuary; understand that where the bishop is, the Church is. He who can consecrate the sanctuary carries with him the sacredness of the sanctuary."

The humiliation of an English king at Becket's tomb had been a lesson too severe and too recent to be forgotten. "We may not dispute with you," the judges replied, "if you choose to let this man go we shall not oppose you, but you must answer for it to the king's highness."

"So be it," answered Hugo, "you have spoken well. I charge myself with your prisoner. The responsibility be mine."

There was probably something more in the case than appears on the surface. The sanctuary system worked in mitigation of a law which in itself was frightfully cruel, and there may have been good reason why the life of the poor wretch should have been spared. The bishop set him free. It is to hoped that "he sinned no more."

The common-sense view which the bishop took of miracles has been already spoken of, but we may give one or two other illustrations of it. Doubtless, he did not disbelieve in the possibility of miracles, but he knew how much imposture passed current under the name, and whether true or false he never missed a chance of checking or affronting superstition.

Stopping once in a country town on a journey from Paris to Troyes, he invited the parish priest to dine with him. The priest declined, but came in the evening to sit and talk with the chaplains. He was a lean old man, dry and shrivelled to the bones, and he told them a marvellous story which he bade them report to their master.

Long ago, he said, when he was first ordained priest, he fell into mortal sin, and without having confessed or done penance he had presumed to officiate at the altar. He was sceptical too, it seemed, a premature Voltairian. "Is it credible," he had said to himself when consecrating the host, "that I, a miserable sinner, can manufacture and handle and eat the body and blood of God?" He was breaking the wafer at the moment: blood flowed at the fracture — the part which was in his hand became flesh. He dropped it terrified into the chalice, and the wine turned instantly into blood. The precious things were preserved. The priest went to Rome, confessed to the Pope himself, and received absolution. The faithful now flocked from all parts of France to adore the mysterious

substances which were to be seen in the parish church; and the priest trusted that he might be honoured on the following day by the presence of Bishop Hugo and his retinue.

The chaplains rushed to the bishop open-mouthed, eager to be allowed to refresh their souls on so divine a spectacle.

"In the name of God," he said quietly, "let unbelievers go rushing after signs and wonders. What have we to do with such things who partake every day of the heavenly sacrifice?" He dismissed the priest with his blessing, giving him the benefit of a doubt though he probably suspected him to be a rogue, and forbade his chaplains most strictly to yield to idle curiosity.

He was naturally extremely humorous, and humour in such men will show itself sometimes in playing with things, in the sacredness of which they may believe fully notwithstanding. It has been said, indeed, that no one has any real faith if he cannot afford to play with it.

Among the relics at Fécamp, in Normandy, was a so-called bone of Mary Magdalene. This precious jewel was kept with jealous care. It was deposited in a case, and within the case was double wrapped in silk. Bishop Hugo was taken to look at it in the presence of a crowd of monks, abbots, and other dignitaries; mass had been said first as a preparation; the thing was then taken out of its box and exhibited, so far as it could be seen through its envelope. The bishop asked to look at the bone itself; and no one venturing to touch it, he borrowed a knife and calmly slit the covering. He took it up, whatever it may have been, gazed at it, raised it to his lips as if to kiss it, and then suddenly, with a strong grip of his teeth bit a morsel out of its side. A shriek of sacrilege rang through the church. Looking round quietly the bishop said, "Just now we were handling in our unworthy fingers the body of the Holy One of all. We passed him between our teeth and down into our stomach; why may we not do the like, with the members of his saints?"

We have left to the last the most curious of all the stories connected with this singular man. We have seen him with King Henry; we will now follow him into the presence of Cœur de Lion.

Richard, it will be remembered, on his return from his captivity plunged into war with Philip of France, carrying out a quarrel which had commenced in the Holy Land. The king, in distress for money, had played tricks with Church patronage which Hugo had firmly resisted. Afterwards an old claim on Lincoln diocese for some annual services was suddenly revived, which had been pretermitted for sixty years. The arrears for all that time were called for and exacted, and the clergy had to raise among themselves 3,000 marks; hard measure of this kind perhaps induced Hugo to look closely into further demands.

In 1197, when Richard was in Normandy, a pressing message came home from him for supplies. A council was held at Oxford, when Archbishop Hubert, who was Chancellor, required each prelate and great nobleman in the king's name to provide three hundred knights at his own cost to serve in the war. The Bishop of London supported the primate. The Bishop of Lincoln followed. Being a stranger, he said, and ignorant on his arrival of English laws, he had made it his business to study them. The see of Lincoln, he was aware, was bound to military service, but it was service in England and not abroad. The demand of the king was against the liberties which he had sworn to defend, and he would rather die than betray them.

The Bishop of Salisbury taking courage from Hugo's resistance, took the same side. The council broke up in confusion, and the archbishop wrote to Richard to say that he was unable to raise the required force, and that the Bishop of Lincoln was the cause. Richard who, with most noble qualities, had the temper of a fiend, replied instantly with an order to seize and confiscate the property of the rebellious prelate. The Bishop of Salisbury was brought upon his knees, but Hugo, fearless as ever, swore that he would excommunicate any man who dared to execute the king's command, and as it was known that he would keep his word the royal officers hesitated to act. The king wrote a second time more fiercely, threatening death if they disobeyed, and the bishop, not wishing to expose them to trouble on his account, determined to go over and encounter the tempest in person.

At Rouen, on his way to Roche d'Andeli, where Richard was lying, he was encountered by the Earl Marshal and Lord Albemarle, who implored him to send some conciliatory message by them, as the king was so furious that they feared he might provoke the anger of God by some violent act.

The bishop declined their assistance. He desired them merely to tell the king that he was coming. They hurried back and he followed at his leisure. The scene that ensued was even stranger than the interview already described with Henry in the park at Woodstock.

Cœur de Lion, when he arrived at Roche d'Andeli, was hearing mass in the church.

He was sitting in a great chair at the opening into the choir, with the Bishops of Durham and Ely on either side. Church ceremonials must have been conducted with less stiff propriety than at present. Hugo advanced calmly and made the usual obeisance. Richard said nothing, but frowned, looked sternly at him for a moment, and turned away.

"Kiss me, my lord king," said the bishop. It was the ordinary greeting between the sovereign and the spiritual peers. The king averted his face still further.

"Kiss me, my lord," said Hugo again, and he caught Cœur de Lion by the vest and shook him, Abbot Adam standing shivering behind.

"Non meruisti — thou hast not deserved it," growled Richard.

"I have deserved it," replied Hugo, and shook him harder.

Had he shown fear, Cœur de Lion would probably have trampled on him, but who could resist such marvellous audacity? The kiss was given. The bishop passed up to the altar and became absorbed in the service; Cœur de Lion curiously watching him.

When mass was over there was a formal audience, but the result of it was decided already. Hugo declared his loyalty in everything, save what touched his duty to God. The king yielded, and threw the blame of the quarrel on the too complaisant primate.

Even this was not all. The bishop afterwards requested a private interview. He told Richard solemnly that he was uneasy for his soul, and admonished him, if he had anything on his conscience, to confess it.

The king said he was conscious of no sin, save of a certain rage against his French enemies.

"Obey God!" the bishop said, "and God will humble your enemies for you — and you for your part take heed you offend not Him or hurt your neighbour. I speak in sadness, but rumour says you are unfaithful to your queen."

The lion was tamed for the moment. The king acknowledged nothing but restrained his passion, only observing afterwards, "If all bishops were like my lord of Lincoln, not a prince among us could lift his head against them."

The trouble was not over. Hugo returned to England to find his diocese in confusion. A bailiff of the Earl of Leicester had taken a man out of sanctuary in Lincoln and had hung him. Instant excommunication followed. The bishop compelled every one who had been concerned in the sacrilege to repair, stripped naked to the waist, to the place where the body was buried, to dig it up, putrid as it was, and carry it on their shoulders round the town, to halt at each church door to be flogged by the priests belonging to it, and then with their own hands to rebury the man in the cemetery from which he had been originally carried off.

Fresh demands for money in another, but no less irregular form followed from the king. There was again a council in London. The archbishop insisted that Hugo should levy a subsidy upon his clergy.

"Do you not know, my lord," the primate said, "that the king is as thirsty for money as a man with the dropsy for water?"

"His majesty may be dropsical for all that I know," Hugo answered, "but I will not be the water for him to swallow."

Once more he started for Normandy, but not a second time to try the effect of his presence on Cœur de Lion. On approaching Angers he was met by Sir Gilbert de Lacy with the news that the Lion-heart was cold. Richard had been struck by an arrow in the trenches at Chaluz. The wound had mortified and he was dead. He was to be buried at Fontevrault, but the country was in the wildest confusion. The roads were patrolled by banditti, and de Lacy strongly advised the bishop to proceed no further.

Hugo's estimate of danger was unlike de Lacy's. "I have more fear," he said, "of failing through cowardice in my duty to my lord and prince. If the thieves take my horse and clothes from me, I can walk, and walk the lighter. If they tie me fast I cannot help myself."

Paying a brief visit to Queen Berengaria, at Beaufort Abbey, on the way, he reached Fontevrault on Palm Sunday, the day of the funeral, and was in time to pay the last honours to the sovereign whom he had defied and yet loved so dearly.

His own time was also nearly out, and this hurried sketch must also haste to its end. One more scene, however, remains to be described.

To Henry and Richard, notwithstanding their many faults, the bishop was ardently attached. For their sakes, and for his country's he did what lay in him to influence for good the brother who was to succeed to the throne.

At the time of Richard's death John was with his nephew Arthur in Brittany. That John and not Arthur must take Richard's place the bishop seems to have assumed as unavoidable; Arthur was but ten years old, and the times were too rough for a regency.

John made haste to Fontevrault, receiving on his way the allegiance of many of the barons. After the funeral he made a profusion of promises to the Bishop of Lincoln as to his future conduct.

The bishop had no liking for John. He knew him to have been paltry, false, and selfish.

"I trust you mean what you say," he said in reply. "Nostis quia satis aversor mendacium,— You know that I hate lying."

John produced an amulet which he wore round his neck with a chain. That he seemed to think would help him to walk straight.

The bishop looked at it scornfully. "Do you trust in a senseless stone?" he said. "Trust in the living rock in heaven — the Lord Jesus Christ. Anchor your hopes in Him and He will direct you."

On one side of the church at Fontevrault was a celebrated sculpture of the day of judgment. The Judge was on his throne; on his left were a group of crowned kings led away by devils to be hurled into the smoking pit. Hugo pointed significantly to them. "Understand," he said, "that those men are going into unending torture. Think of it, and let your wisdom teach you the prospects of princes, who, while they govern men, are unable to rule themselves, and become slaves in hell through eternity. Fear this, I say, while there is time. The hour will come when it will be too late."

John affected to smile, pointed to the good kings on the other side, and declared, with infinite volubility, that he would be found one of those.

The fool's nature, however, soon showed itself. Hugo took leave of him with a foreboding heart, paid one more bright brief visit in the following year to his birthplace in the south, and then returned to England to die. He had held his see but fourteen years, and was no more than sixty-five. His asceticism had not impaired his strength. At his last visit to the Chartreuse he had distanced all his companions on the steep hill-side, but illness overtook him on his way home. He arrived in London, at his house in the Old Temple, in the middle of September, to feel that he was rapidly dying. Of death itself, it is needless to say, he had no kind of fear. "By the holy nut," he used to say, in his queer way ("per sanctam nucem,* sic enim vice juramenti ad formationem verbi interdum loquebatur"), "by the holy nut, we should be worse off if we were not allowed to die at all."

* Perhaps for "crucem," as we say "by *Gad*," to avoid the actual word.

He prepared with his unvarying composure. As his illness increased, and he was confined to his bed, his hair shirt hurt him. Twisting into knots, as he shifted from side to side, it bruised and wounded his skin. The rules of the order would have allowed him to dispense with it, but he could not be induced to let it go; but he took animal food, which the doctor prescribed as good for him, and quietly and kindly submitted to whatever else was ordered for him. He knew, however, that his life was over, and with constant confession held himself ready for the change. Great people came about him. John himself came; but he received him coldly. Archbishop Hubert came once; he did not care, perhaps, to return a second time.

The archbishop, sitting by his bed, after the usual condolences, suggested that the Bishop of Lincoln might like to use the opportunity to repent of any sharp expressions which he had occasionally been betrayed into using. As the hint was not taken, he referred especially to himself as one of those who had something to complain of.

"Indeed, your grace," replied Hugo, "there have been passages of words between us, and I have much to regret in relation to them. It is not, however, what I have said to your grace, but what I have omitted to say. I have more feared to offend your grace than to offend my Father in heaven. I have withheld words which I ought to have spoken, and I have thus sinned against your grace and desire your forgiveness. Should it please God to spare my life I purpose to amend that fault."

As his time drew near, he gave directions for the disposition of his body, named the place in Lincoln Cathedral where he was to be buried, and bade his chaplain make a cross of ashes on the floor of his room, lift him from his bed at the moment of departure, and place him upon it.

It was now a November afternoon. The choristers of St. Paul's were sent for to chant the compline to him for the last time. He gave a sign when they were half through. They lifted him and laid him on the ashes. The choristers sang on, and as they began the Nunc Dimittis he died.

So parted one of the most beautiful spirits that was ever incarnated in human clay. Never was man more widely mourned over or more honoured in his death. He was taken down to Lincoln, and the highest and the lowest alike had poured out to meet him. A company of poor Jews, the offscouring of mankind, for whom rack and gridiron were considered generally too easy

couches, came to mourn over one whose justice had sheltered even them.

William of Scotland was with John in Lincoln: and on the hill, a mile from the town, the two kings, three archbishops, fourteen bishops, a hundred abbots, and as many earls and barons, were waiting to receive the sad procession.

King John and the archbishops took the bier upon their shoulders, and waded knee-deep through the mud to the cathedral. The King of Scotland stood apart in tears.

It was no vain pomp or unmeaning ceremony, but the genuine healthful recognition of human worth. The story of Hugo of Lincoln has been too long unknown to us. It deserves a place in every biography of English Worthies. It ought to be familiar to every English boy. Such men as he were the true builders of our nation's greatness. Like the "well-tempered mortar" in old English walls, which is hard as the stone itself, their actions are the cement of our national organization, and bind together yet such parts of it as still are allowed to stand. J. A. F.

THE BEST FAMILY IN ENGLAND.—We are often asked which is the best family in England? It is not an easy question to answer. What tests can we apply to determine it? Let us try these—length of descent, ancient renown, and historical importance. Length of descent throws out of competition many names, such as Howard, Russell, and Cecil. Ancient renown throws out such as Seymour, Talbot, and even Stanley, none of which were above the middle ranks five hundred years ago. But all the conditions seem to be fulfilled by four families—Hastings, Feilding, Courtney, and Nevil. The first has been more or less noble ever since the Conquest. The second is said, but on doubtful grounds, to have been of the imperial Hapsburg race, and to have settled in England in the reign of Henry III. The Courtneys claim to be descended from Pharamond, the founder of the French monarchy, whose date is placed by historians at the middle of the fifth century; and from Atho, some of whose family were Emperors of Constantinople, and previously Counts of Edessa and Kings of Jerusalem; they are also of very ancient nobility in England, and of considerable historical and political importance in our own day. Nevertheless, we think, all things considered, the best family in England is that of the Nevils. The ancestors of the Nevils were Earls of Northumberland when we first hear of them in Saxon times, nearly a thousand years ago. From Earl Cospatrick, a contemporary of the Conqueror, derived the Nevils of Raby. They received the name and estates of Nevil with the heiress of a Norman family: they could boast of sufficient importance during the wars of the Roses, to furnish one Archbishop of York, one duke (the Duke of Bedford, nephew of the King-maker), one Marquis (the Marquis of Montacute, brother of the King-maker), Earls of Westmorland, and Salisbury, and Warwick, the Lords Fauconbrig, Latimer, and Abergavenny, from which latter the only remaining branch is descended. No other English family fulfills the conditions laid down above so satisfactorily as this one. The Courtneys run them very close, but the chief fame of the Courtneys is of foreign growth, whilst the Nevils are Anglo-Saxon, and have been here ever since they became a family. Their pedigree is as well authenticated as any pedigree of such length can be; and in ancient honour and historical importance, they yield to none. They were in the highest rank of nobles before the Conquest, and have continued noble ever since; and it may be said of one of them what can be said of perhaps no other English subject, that he could by his single voice control the succession of the crown. If it be asked which are the best families in Scotland and Ireland, we answer, those of Hamilton and Fitzgerald. Instead of Hamilton, we should perhaps say Douglas, as the Dukedom of Hamilton may be said to obscure the ancient name and titles of that family. The Douglases became Hamiltons by female descent in 1698, when they rose to the head of the Scotch Peerage roll. In Ireland the best family is also the highest, the Norman stock of Fitzgerald, Dukes of Leinster, taking easily the first place. But genealogists, unless they happen to be themselves Scotch or Irish, are apt to look with suspicion upon most Scottish or Irish pedigrees. Many of the oldest lines in North Britian would not be admitted as legitimate in England, owing to the operation of the peculiar marriage law; and the more ancient-looking Irish pedigrees are similarly invalidated by the very anomalous condition in which matrimony remained as late as the reign of Queen Elizabeth: Mr. Froude's account of the household of Shan O'Neill is an example. It is, therefore, difficult to trace any house in either of the sister kingdoms beyond a couple of centuries at farthest, without what in the eyes of an English genealogist would prove a final break.

Cassell's Magazine.

THE widow of Belzoni, the Egyptologist, has died at the age of eighty-eight. She had a pension of 200*l.* per annum from Government.

From The Spectator.

MEASURING STAR-HEAT.

LAST year the scientific world hailed with interest the discovery that heat comes to us from beyond the infinite depths which separate our earth from the fixed stars, bringing us a message not less full of interest than that conveyed by the stellar light-rays. It seemed wonderful indeed that any contrivance man could devise should enable him to render sensible the heat sent forth on all sides from those distant suns. We know that at midday the summer sun pours his beams so fiercely on the earth that we compare their heat with that of a fire near at hand. But we recognize the fact that even within the known bounds of the solar system the sensible heat his direct rays can produce is diminished more than a thousandfold. And knowing this, it seems as though the physicist in Neptune — supposing that arctic world to be the abode of reasoning creatures — would have a problem of some difficulty in the measurement of the warmth received from the tiny sun which rules the Neptunian day. But the distance which separates Neptune from the central luminary of the planetary scheme sinks into utter nothingness beside the vast gap which lies between that scheme and the nearest of the fixed stars. Seven thousand times farther from the sun than Neptune stands the advanced guard of the stellar host, the famous star which marks the raised fore-foot of the Centaur. Light and heat from beyond that enormous distance are reduced fifty-million times more than the solar light and heat which shed their faint rays over the Neptunian ice-fields.

Strange, indeed, and difficult was the problem which had thus been mastered. And yet the lesson taught us was one which in another form we had already learned. We had been able by the aid of a new and wonderful instrument — the spectroscope — to assure ourselves that the stars are suns in all essential respects resembling our own. We know that around them hang suspended the vapours of metals which only the fiercest heat can melt, for we saw that the light which came to us from them had been robbed of the waves which those metallic vapours alone have the power of selectively absorbing.

But now a new and more difficult task has been achieved. Astronomy has not been content with the discovery that the stellar heat can be felt, but has faced the more arduous problem of *measuring* that heat. Worthy of the task has been the instrument with which it has been undertaken. The great equatorial of the Greenwich Observatory is perhaps surpassed by no telescope in the world as regards the optical qualities which the astronomer delights in. Constructed by the same eminent opticians who made the famous Poulkova refractor and the telescope which has done such distinguished service in the cause of science at Cambridge, U.S., and not inferior to either of those telescopes either in size or quality, this splendid instrument has been mounted in a manner which does infinite credit to the mechanical ingenuity of our Astronomer Royal. A corps of observers and mathematicians unsurpassed perhaps in the world, garrisons the noble Observatory in which it is placed. With a liberality which cannot be too highly praised (and which might with advantage, perhaps, be extended more widely), Government has taken care that the chief national Observatory shall so be provided for, in all respects, as worthily to support the national reputation. Future ages will doubtless record a long list of physical researches in which the powers of the noble equatorial of our nobly furnished Observatory shall have been employed by the skilful and practised astronomers now gathered at Greenwich.

Its first great achievement in this special direction is one of which our country may well be proud. Many months since, Mr. Stone, F.R.S., the chief assistant at Greenwich, and already known to fame for his successful attacks upon the problem of the sun's distance, turned his thoughts towards the application of the powers of the great equatorial to the determination of stellar heat. The results he then attained, though highly interesting, did not become widely known, Mr. Huggins having anticipated their publication by communicating to the Royal Society his own successful treatment of the same problem. But, as we have said, it was the simple fact that we do receive heat from the stars, not a quantitative estimate of their heating powers, which was then laid before the scientific world. Mr. Stone hoped to be able to announce the actual amount of heat which the first-class stars send to this globe on which we live.

A little consideration will show the enormous difficulty of the problem. A very delicate thermometer placed at night in the open air responds to a thousand influences which the ordinary observer would be inclined wholly to disregard. Long ago, Gilbert White, of Selborne, noticed how the thermometer rises at night as clouds pass overhead, and sinks as the heavens grow clearer. But as the science of meteorology has progressed, men have recognized

the fact that changes much less obvious than these affect the thermometer. On each of two different nights the sky may be beautifully clear, the floor of heaven "thick inlaid with patines of bright gold," and yet the condition of the air may be so different that on one night the earth's heat may be rapidly radiating into space, while on the other an unseen presence in mid-air checks the escaping heat and makes the weather warm and genial. Though on each night "the heavens break open to their highest," there is thus the most essential difference in the circumstances under which the stellar heat would be measured, since the same aqueous but unseen veil which cuts off the escaping earth-heat, must in part, at least, influence the heat which is sent to earth from beyond the stellar spaces.

By an ingenious arrangement Mr. Stone was enabled to overcome this difficulty in great part, and to secure that which so delighteth the soul of the man of science, a reliable zero. Let not the uninitiated be confounded by this mystic word,— it implies merely that which may be compared to the end of a rule or measuring-tape. To know if a star sends us heat at any moment we must know what heat our instruments would show before receiving the star's heat; otherwise, what are we to measure from? But, as we have said, this initial heat is continually varying. What Mr. Stone had first to do, then, was to master this difficulty. Others remained which we have not space to specify, but these also he overcame.

At last, after enormous labour, the heat received from two well-known stars has been measured. Arcturus, the leading brilliant of the Herdsman, and Vega, the chief star of the Lyre, are the two orbs dealt with by Mr. Stone. From a careful measurement of their light, Sir John Herschel long since determined that these stars are of equal splendour; but Arcturus shines with a ruddy yellow light, while Vega exhibits a colour which has been compared to the gleam of highly-polished steel. The estimates of their heat correspond with the aspect of these orbs. The fiery Arcturus sends us about twice as much heat as the bluish Vega. Minute indeed is the quantity of heat received from either star, even Arcturus having a direct heating effect corresponding to but about the 800,000th part of a degree Fahrenheit. Or, Mr. Stone remarks, the result may be otherwise stated as follows: — The heat received from Arcturus is sensibly the same as that from the face of a three-inch iron cube full of boiling water at a distance of 383 yards.

To the worlds which circle around these brilliant stars our sun doubtless supplies no larger a degree of heat; nay, we have good reason to believe that he is relatively an insignificant orb. Around Arcturus are well-warmed worlds, nourished by the rays which belong to the red end of the spectrum. Those which circle around Vega, if equally distant, are less plentifully supplied with heat. On the other hand, if one may speculate so confidently as to the state of these worlds as to regard photography as an art practised among their inhabitants, then must the people warmed by Arcturus sit longer for their portraits than those on whom the brilliant Vega pours his powerful actinic rays. Seriously, the researches we have been dealing with suggest strange thoughts for our consideration. The question of the plurality of worlds had seemed perplexing enough when we considered merely the strangely various conditions under which living creatures must subsist in the different orbs which circle round our sun. But when we contemplate the varieties presented among the fixed stars, the mind is lost in the attempt to conceive the enormous range of variety which must characterize the races of living creatures subsisting in the systems of which those stars are the central luminaries.

TERRESTRIAL MAGNETISM. — The origin of terrestrial magnetism has been much disputed. In general it has been ascribed, the *Globe* says, to variations of temperature on the surface and in the interior of the globe. But Dr. Meyer has recently emitted the hypothesis that the phenomenon is due to the trade winds, and is the result of the friction exerted by the air on the surface of the sea. Thus the air assumes an electrical condition the opposite of that of the water. It then rises under the warmth of the sun, and the cold air from the pole rushing in beneath drives it toward the pole, where from its high tension it produces the Aurora borealis. Owing to the physical conformation of the globe, the electric activity of the Southern Hemisphere is greater than that of the Northern, and hence there is a constant disturbance of the electrical equilibrium, not only between the pole and the equator, but also between the North and South Poles. We have quoted this from a very crude abstract, published in the second edition of the *Academy*, of a paper read by Dr. Meyer at the meeting of the German Scientific Association.

From The Leisure Hour.

VANISHED AND VANISHING INDUSTRIES.

Among the household changes which point to the decease or decay of certain industrial pursuits, may be mentioned the introduction of the sewing-machine, which in a single day will do as much work as a brace of busy sempstresses would get through in a week. Again, the knitting needles, which in our young days were everlastingly busy, are now becoming rarities except in the houses of the poor, where the knitting of stockings is still carried on by the old or the crippled and blind incapable of other labour. Among the kitchen gear we no longer see the horn lanterns which used to light us about the garden or the streets after dark in the days when there was no gas; or if we do see them, it is as relics of old, not specimens of recent manufacture. The making of that clear, transparent horn must have become almost a lost art. And what of the links a yard long which used to hang in the scullery, to be lighted on pitch-dark nights and foggy days? They are gone, though in some places the huge iron extinguishers are left behind, and still figure on the quaint porticoes of old-fashioned houses. Then one hears no longer the clatter of pattens about the house basement and the courtyard on rainy days, nor wonder at Molly's lofty stature as she stalks about amidst the sloppy torrent. Is patten-making, too, becoming extinct? At our meals we seldom now set eyes on a plated article of the old type. Clever as was the process of spreading a plate of pure silver upon one of copper, and working both up together into the form of any article required, it has had to give way before the process of electro-plating, which produces the same result so much more readily and cheaply, and which deposits the silver upon the baser metal by a method which renders its attachment so much more durable. Of the fine arts there is one which seems to be surely dying out, and the decline and loss of which we can but deeply regret. We speak of the exquisite art of miniature painting, which received a mortal blow by the discovery of photography, and has been dying by inches ever since. There is no hope that this art will ever revive or be again what it once was, and therefore we would advise those in the possession of good miniatures to make the most of them and preserve them with care, for the day will surely come when those of first-rate merit will be prized as gems and diligently sought after. Such men as Robertson, Thorburn, Chalons, Ross, and not a few others who might be mentioned, will have no successors — it is impossible in the nature of things that they should have; a man must possess real genius and devote his life to the work, to be able to do what these men did, and it is not to be expected that such men will enter the lists against a chemico-mechanical process which, after a sort, accomplishes in a few seconds what would cost them weeks or months of careful and delicate labour. On looking abroad in the streets we might fancy at first that time and change had played havoc among the peripatetic industries, and that most of them had vanished. But it is not so. If some have disappeared, the mass of them yet remain, though they are not so demonstrative as they once were, for the simple reason that many of the old London cries have been silenced by the municipal authorities. Thus the sweep is obliged to mitigate his matutinal bawling; the newsman who, in the days when news was a novelty, was in the habit of rushing along the highways, now blowing a blast on his horn, and now startling the street with the cry of "Great news! News! Great news!" has been bereft of his horn and doomed to silence, and in revenge has pretty generally relinquished the profession in favour of some small boy who throws the paper down your area, or pokes it with a joke at your bare-elbowed Abigail, as she sweeps the door-front. The law which silenced the street cries excepted from its operations the hawkers of goods readily perishable. Thus the tinkle of the muffin-bell, the explosive shout of the travelling fishmonger, and the long drawl of the strawberry-girl were never put down, but are heard to this day, even on Sundays. We may add, moreover, that the law is not very stringently enforced so long as the criers of any kind of wares conform to the policeman's views of propriety and keep moving on. Of the street traders who have really disappeared, the one we miss most is the wandering pieman, immortalized by Hogarth in his "March to Finchley," and dear to the memories of many a sexagenarian who in times long past delighted in his sweet and savoury wares. Not that the pieman has vanished, by any means; he has but quitted the streets, and, assuming the dignity of the tax-paying tradesman, established himself in a shop. The penny pie is still an institution, and if we may judge by the quantities eaten under cover instead of *al fresco*, or sold over the counter to be consumed at home, is a more favourite refection than ever it was.

From The Pall Mall Gazette.

DUST AND DISEASE.

ONE of the most remarkable and, perhaps, one of the most prolific discoveries of modern science, was announced and described by Professor Tyndall in a lecture delivered at the Royal Institution on Friday last. The subject of the lecture, which was illustrated by a series of very beautiful experiments or demonstrations, was the very familiar one of "Dust and Disease;" and its object was to show the probability of an intimate connection between atmospheric dust and epidemic diseases. Everybody knows that whenever a direct ray of sunshine crosses a shaded room, its direction is made manifest by a line of apparent vapour. Looking at this vapour it is seen to consist of innumerable particles of dust which float in the atmosphere and, catching and reflecting the sunshine, are rendered visible to us. In the course of some beautiful experiments on the decomposition of vapours by light, Dr. Tyndall found it to be essential that he should get rid of this floating dust. He strained the air through a tube filled with bits of glass wetted with concentrated sulphuric acid, and through another tube filled with bits of marble wetted with caustic potash; he even made it bubble through the liquid acid and the potash solution, but still the dust particles remained in it. He tried various other ways of straining out this dust, but none of them succeeded. At length he passed the air on its way to the tube over the flame of a spirit-lamp, and at once every particle of the dust disappeared. It was, therefore, organic matter, and the flame had burnt it. Passing the air a little more quickly over the flame, a fine blue cloud appeared in the tube — the smoke of the dust particles. The organic and combustible nature of these particles was a discovery, for they had hitherto been taken to be inorganic and incombustible. Air was then passed through a tube which contained a roll of platinum gauze, and it was found that when the platinum was cold the dust particles all passed through with the air, but that when it was made red-hot the dust particles were all consumed. In this case, too, when the air was forced quickly through, a fine blue cloud of smoke appeared, just as in the experiment with the spirit-lamp. An attempt was then made to burn the dust particles by the concentrated rays of a convergent mirror, but it failed; the particles flitted too quickly through the focus of the burning ray to be consumed by it. The next experiment was to put the flame of a spirit-lamp in the ray of light which was revealing the floating dust. At once the flame was seen to be surrounded by wreaths of darkness, resembling intensely black smoke. On lowering the flame beneath the beam of light the same dark masses were seen wreathing upwards. "They were at times," said Dr. Tyndall, "blacker than the blackest smoke that I have ever seen issuing from the funnel of a steamer, and their resemblance to smoke was so perfect as to lead the most practised observer to conclude that the apparently pure flame of the alcohol required but a beam of sufficient intensity to reveal its clouds of liberated carbon." But when a red-hot poker was placed under the beam the same black wreaths came floating through. A hydrogen flame was next put under it, and the whirling masses of darkness wreathed upwards more copiously than ever. The blackness was therefore nothing but air from which all dust particles had been burned out, and which, consequently, contained nothing to catch the light and reflect it to the eye as the dust particles do. Here, however, a difficulty came in. The same effect was produced by a copper ball not hot enough to burn the dust, and by a flask filled with hot water. In this case it was found that the air was rarefied by the warmth, and as the dust particles were not heated to the same extent it dropped them and floated upwards without them. Other gases, even common coal gas carefully prepared so as to exclude the dust particles, have the same black appearance when they cross a ray which the dust-laden air renders visible, and if coal gas or hydrogen be let into the top part of a glass shade which has been placed in a sunbeam or a ray of the electric light, the line between the dust-laden air and the gas is rendered visible — where the air is the shade will seem full of the illuminated particles, where the gas is it will appear absolutely empty. "The air of our London rooms is filled with this organic dust, nor is the country air free from its pollution." It only needs a sufficiently powerful beam to make the air appear as a semi-solid rather than a gas. Nobody could in the first instance, without repugnance, place the mouth at the illuminated focus of the electric beam and inhale the dirt revealed there. Yet we are inhaling it every moment, and the wonder is that so small a portion of it should be injurious to health.

What is the portion of this ever-present and all-pervading dust which is injurious to life? Now, it was long believed that epidemic diseases were propagated by malaria, which consisted of organic matter in a state

of motor-decay; that when such matter was taken into the body through the lungs or the skin, it had the power of spreading in it a similar decay — yeast was a case in point. Why should not a bit of malarious matter operate in the body as a little leaven, leavening the whole lump? But in 1836, Cagnaird de la Tour discovered the yeast plant, which when placed in a proper medium grows and spreads and produces what we call fermentation. In the next year Schwann, of Berlin, discovered the plant independently. He also proved that when a decoction of meat is effectually excluded from common air, and supplied solely with air which has been raised to a high temperature, it never putrefies. Putrefaction therefore, he said, came from the air, and could be destroyed by a sufficiently high temperature. Helmholtz and Ure repeated and confirmed his experiments; but the high authority of Gay-Lussac, who ascribed putrefaction to oxygen, drove chemists back on the old notion. That notion was finally exploded by Pasteur, who proved that the true ferments are organized beings who find in what we call ferments their necessary food. Side by side with these discoveries grew up the germ theory of epidemic disease. Kircher expressed the idea, and Linnæus favoured it, that epidemic diseases are due to germs which, floating in the atmosphere, enter the body and produce disease by the development of parasitic life. Sir Henry Holland has favoured this theory, which derives its strength from the perfect parallelism between the phenomena of contagious disease and those of life. As an acorn planted in the soil gives birth to an oak which produces a whole crop of acorns, each of which has power to reproduce its parent tree, and thus from a single seed a whole forest may spring, so a germ of disease planted in a human body grows and shakes abroad new germs, which, meeting in other human bodies with their proper food and temperature, finally take possession of whole populations. Thus Asiatic cholera, beginning in a small way in the Delta of the Ganges, spread itself in seventeen years over nearly the whole habitable world. An infinitesimal speck of small-pox virus will develop a crop of pustules, each charged with the original poison. The reappearance of this scourge, as in the case of the *Dreadnought* at Greenwich, so ably reported on by Dr. Budd and Mr. Busk, is explained by the theory which ascribes it to the lingering of germs about the infected place. Surgeons have long known the danger of admitting air to an opened abscess, and abscesses are always opened by an instrument which carefully excludes the air from contact with the wound. The instrument should, of course, be scrupulously clean; but it can only be made perfectly clean in an atmosphere of dust by being made as hot as its temper will bear. This is not done, and therefore inflammation often sets in after the first operation; rapid putrefaction accompanies it, and the pus, which at first showed no traces of animal life, is now found to be full of active little organisms called vibrios. Professor Lister, from whose letter this fact is derived, contends that this astounding development of animal life is due to the entry of germs into the abscess during the first operation, and their subsequent development by favourable circumstances. Hay fever is another case in point. The celebrated physiologist Helmholtz suffers from the 20th of May till the end of June from a catarrh of the upper air-passages, and he has found that during this period, and at no other, his nasal secretions are peopled by these vibrios. They nestle in the cavities of the nose, and a sneeze is necessary to dislodge them. These are uncomfortable statements, but if the germ-theory is found to be true, it will give definiteness to our efforts to stamp out disease; and it is only by some definite efforts under its guidance that its truth or falsehood can be established. Hence Dr. Tyndall says he reads with sympathy such papers as those of Dr. Budd, of Bristol, on cholera, scarlet fever, and small-pox. Dr. Budd's imagination may occasionally tempt him to a flight beyond his facts, but without this dynamic heat of heart the stolid inertia of the Briton can never be overcome. As long as heat can warm the truth without singeing it much, as long as enthusiasm can overmatch its mistakes by unequivocal examples of success, "so long," said Dr. Tyndall, "I am disposed to give it a fair field to work in, and to wish it God-speed."

Returning to the dust, Dr. Tyndall drew certain practical conclusions from the survey of these two classes of facts. The dust cannot be blown away by ordinary bellows, since the air they send out is equally full of the particles. But fill the nozzle with cotton wool, not too tightly pressed, and the air is filtered, and being then blown across the beam of light, forms a clean band of darkness, like the air from the spirit-lamp, or from the heated platinum wire. This was the filter Schroeder used in his experiments on spontaneous generation; it was also turned to account in the excellent researches of Pasteur. Since 1868

Professor Tyndall has constantly employed it himself. The most interesting of all illustrations of this filtering process is furnished by the human breath. Fill the lungs with ordinary air and breathe through a warm tube — warmed to prevent the condensation of the watery particles — across the beam of light which is revealing the dust-particles in the air. The particles move with the moving air, but the current from the lungs shows at first as many particles as the ordinary atmosphere. Gradually, however, the particles clear away from the course of the breath, and by the time you have completed your expiration the expired air cuts a sharp, black line through the motes in the sunbeam. The air has left its dirt in the lungs, and the last portions of the expired breath are free from floating dust. But empty the lungs as far as possible, and then inhale a deep breath through a handful of cotton wool, and on expiring this air in the same way it cuts a black line in the sunbeam at once. Place the tube below the beam, and blow upwards, and the air rises through the dancing particles like black smoke, just as it did from the heated surfaces on which the dust was burnt. The cotton wool has completely intercepted the floating matter on its way to the lungs, and as no dust was inhaled none is exhaled. Here, then, is the philosophy of an instinctive habit of medical men. In a contagious atmosphere the physician puts his handkerchief to his mouth, and inhales through it: in so doing he keeps back the floating germs. If the poison were a gas, it could not be thus intercepted. Dr. Bence Jones repeated Dr. Tyndall's experiment with a silk handkerchief, with a similar but less marked result. Cotton wool is, in fact, the best and surest filter, and a physician who wants to hold back from the lungs of his patient, or from his own lungs, the germs by which contagious disease is said to be propagated, will employ a cotton-wool respirator. "After the revelations of this evening," concluded Dr. Tyndall, —

Such respirators must, I think, come into general use as a defence against contagion. In the crowded dwellings of the London poor, where the isolation of the sick is difficult, if not impossible, the noxious air around the patient may by this simple means be restored to practical purity. Thus filtered, attendants may breathe the air unharmed. In all probability the protection of the lungs will be the protection of the entire system. For it is exceedingly probable that the germs which lodge in the air passages, and which, at their leisure, can work their way across the mucous membrane, are those which sow in the body epidemic disease. If this be so, then disease can certainly be warded off by filters of cotton wool. I should be most willing to test their efficacy in my own person; and time will decide whether in lung-diseases also the woollen respirator cannot abate irritation, if not arrest decay. By its means, so far as the germs are concerned, the air of the highest Alps may be brought into the chamber of the invalid.

This lecture having given rise to some criticism, Professor Tyndall replied as follows in a letter to the *Pall Mall Gazette*: —

"Would the senior physician of Colchester Hospital, whose letter you published in yesterday's *Pall Mall Gazette*, permit me to take him to the top of the Matterhorn, and to show him the sky of Italy overhead? If not, will he accept my assurance that the sky is blue?

"Will he believe me when I say that this deep colour is, or may be, produced by particles suspended in the air which are not only invisible to the naked eye but irreducible by the highest powers of the naked microscope? That hence, without seeing the individual particles, we may have indubitable evidence of their existence.

"This, indeed, is the point wherein my method differs from preceding ones, and is, I think, destined powerfully to supplement them. The microscope seeks for single particles; I take them *en masse*, and can demonstrate their existence by the light which they scatter after they have passed utterly beyond the range of the microscope.

"Were the 'dark spaces' referred to by Dr. Bree 'full of germs,' I should, in my opinion, have there the blue of the sky instead of 'the darkness of stellar space.'

"'It is doubtful,' says Dr. Bree, 'whether the germs of disease have ever been seen by the most powerful microscope; it is therefore clear that they would pass through cotton wool with the atmosphere, and pass into the lungs as though the wool were absent.'

"My experiments render the very reverse of this 'quite clear' to me.

"I have been favoured by Dr. Angus Smith with a copy of his fifth annual report, from which I glean some interesting facts, regarding the air of Manchester. To catch in water the floating matter of the air, Dr. Smith places a small quantity of the liquid in a bottle and shakes it up with successive charges of air. In one instance he did this 500 times, and then handed over his bottle to an able microscopist, Mr. J. B. Dancer, for examination. The bottle had been shaken in the open air, through which, how-

ever, Dr. Smith could not see any dust blowing; at all events, if there were dust, it was only such as people are called upon to breathe. Here are some of the revelations of Mr. Dancer: —

"*Fungoid Matter.* — Spores or Sporidiæ appeared in numbers, and, to ascertain as nearly the numerical proportion of these bodies in a single drop of the liquid, the contents of the bottle were well shaken, and then one drop was taken up with a pipette. This was spread out by compression to a circle half an inch in diameter. A magnifying power was then employed, which gave a field of view of an area exactly 100th of an inch in diameter, and it was found that more than 100 spores were contained in this space. Consequently the average number of spores in a single drop would be 250,000. These spores varied from 10,000th to 50,000th of an inch in diameter.

"For the purpose of obtaining a rough approximation to the number of spores or germs of organic matter contained in the entire fluid received from Dr. Smith, I measured a quantity by the pipette, and found it contained 150 drops of the size used in each examination. Now I have previously stated that in each drop there were about 250,000 of these spores, and as there were 150 drops, the sum total reaches the startling number of 37 and 1-2 millions; and these, exclusive of other substances, were collected from 2,495 litres of the air of this city — a quantity which would be respired in about ten hours by a man of ordinary size when actively employed. I may add that there was a marked absence of particles of carbon among the collected matter.

"Apart from their other effects, the mere mechanical irritation produced by the deposition of these particles in tender lungs must go for something. They may be entirely withheld by a cotton wool respirator. In various dusty trades and occupations the respirator will also be found a comfort and protection. I may add, in reference to inquiries addressed to me, that the respirator is placed unconditionally at the disposal of medical men.

"Since writing these lines, I have received from Wigan a letter, which I enclose; it shows that in this case, as in so many others the needs of men have prompted remedies in advance of the suggestions of science. — I am, Sir, your obedient servant,

"JOHN TYNDALL.

"Royal Institution, Jan. 26."

"Wigan, Jan. 25.

"DEAR SIR, — Your very able and interesting lecture of last week has been much read and admired in this locality, and fully confirms a practice very generally adopted for many years past by persons working in some parts (particularly the preparatory process) of the cotton-spinning trade, viz., to hold in their teeth a ball of cotton sufficiently large to protect not only the mouth, but also the apertures of the nose, to prevent the inhalation of dust and small particles of cotton.

"Thinking this slight corroboration of the principle held by you may be deemed worthy of acceptance, I am, dear sir, yours obediently,

"WM. HIGGINBOTHAM.

"Professor Tyndall."

FORMS FOR TELEGRAPHIC MESSAGES. — The Post-office authorities have prepared for the use of the public forms for telegraphic messages to be used when the whole system of inland telegraphs is acquired by the Government on the 20th of the present month. The form is very simple and complete, and differs in one or two important respects from those hitherto employed by the companies — the novelties, it may be added, being decided improvements. The principal of these refers to the arrangement of the words that make up the message. A separate space in lines is allotted to each word, and the corresponding charge is printed clearly on the margin, so that the sender can see at a glance how much he has to pay, and the receiving clerk need be at no trouble in calculating how much he has to charge. Each of the forms thus divided into spaces is prepared for a message of fifty words, which is assumed to be sufficient in the great majority of instances. In the right hand upper corner of the page a blank space is left for the stamps which will probably be almost exclusively used to cover the charges of transmission. Attached to the form are directions for the guidance of the sender, with a tariff of charges, and full information as to the arrangements for porterage.

ONE of the leading historical societies in the United States has started a subscription for the purchase of a unique work in one hundred volumes, for a sum of 40,000 dollars. It is a *scissors* history of the Great Rebellion, and the cutter-out is a Mr. T. S. Townsend.